RSO installation manual

CENTURION

RSO™
Roller-shutter Operator

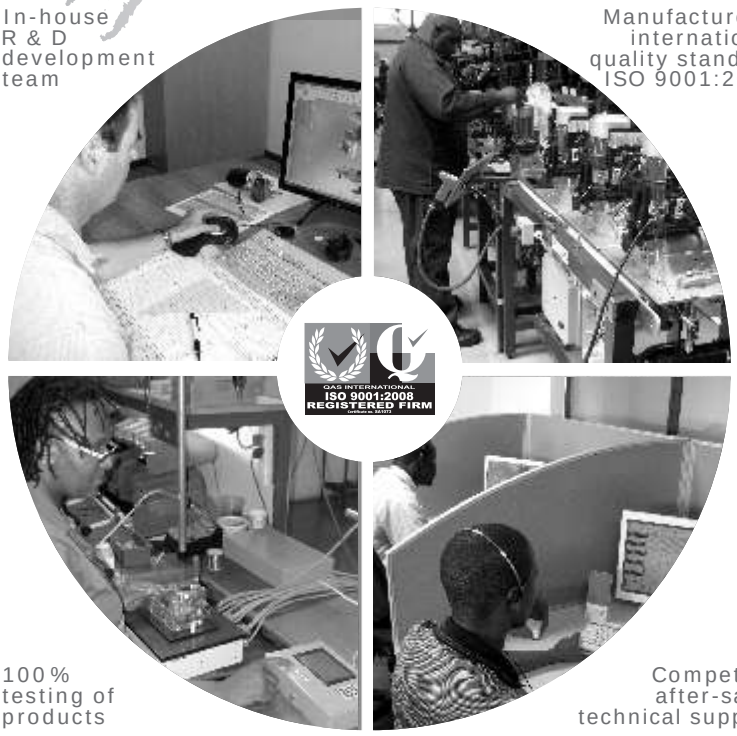
ROLLER-SHUTTER OPERATORS

Company Profile

1986 1990 1995 1999 Centurion Systems today

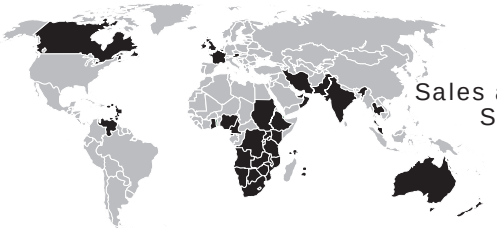
In-house R & D development team

Manufacture to international quality standard ISO 9001:2008



100% testing of products

Competent after-sales technical support



Sales and support throughout Southern Africa and over 50 countries worldwide

CENTURION SYSTEMS (Pty) Ltd reserves the right to make changes to the products described in this manual without notice and without obligation of CENTURION SYSTEMS (Pty) Ltd to notify any persons of any such revisions or changes. Additionally, CENTURION SYSTEMS (Pty) Ltd makes no representations or warranties with respect to this manual.
No part of this document may be copied, stored in a retrieval system or transmitted in any form or by any means electronic, mechanical, optical or photographic, without the express prior written consent of CENTURION SYSTEMS (Pty) Ltd

Contents

Mechanical Setup Page 1
Electrical Setup Page 1
Commissioning and Handover Page 2

IMPORTANT SAFETY INSTRUCTIONS Page 3

1. Declaration of conformity Page 6
2. Icons used in this booklet Page 7
3. General description Page 8
4. Specifications Page 9
   - Physical dimensions Page 9
   - Technical specifications Page 9
5. Determining shutter weight and profile Page 10
   - Roller-shutters with perforated profiles Page 10
   - Roller-shutters with flat blind steel profiles Page 11
6. Product identification Page 13
7. Description of terminal functions Page 16
   - Opening the enclosure Page 16
   - Motor controller for RSO5 only Page 17
   - Interface board for RSO5 only Page 18
   - RSO5DC controller Page 21
8. Required tools and equipment Page 24
9. Preparation of site Page 24
   - General considerations for the installation Page 24
10. Cabling requirements Page 25
    - RSO5DC cabling requirements Page 26
11. Installation procedure Page 27
    - Retrofit installations Page 27
12. Electrical setup Page 30
    - Secure wall pendant Page 30
    - Connect all wiring Page 30
    - RSO5DC connection and wiring Page 31
    - RSO5DC menu navigation map Page 34
    - RSO5DC controller features Page 37
    - RSO5DC diagnostic LEDs Page 49
    - RSO5DC Roller-shutter status LED Page 49
    - RSO5DC LCD display Page 50
    - RSO5DC buzzer feedback Page 51

RSO5DC factory defaults schedule Page 52
Power connections Page 54
13. Setting the travel limits Page 55
The limit switch assembly Page 55
RSO5, RSO5R and RSO5R3P Page 56
RSO5DC Page 56
RSO9 Page 58
14. Connecting an external radio receiver Page 59
15. Connecting infrared beams Page 60
16. RSO5DC wiring diagram for other inputs Page 62
17. Manual operation Page 63
18. Installation handover Page 64

Mechanical setup

These abbreviated instructions are for the experienced installer who needs a checklist to get a standard installation up and running in the minimum of time.

Detailed installation features and functions are referred to later in this manual.

These abbreviated instructions are for the experienced installer who needs a checklist to get a standard installation up and running in the minimum of time.

Detailed installation features and functions are referred to later in this manual.

step 1 Heed necessary site considerations Page 24

step 2 Check cabling requirements Page 25

step 3 Gather required tools and equipment Page 24

step 4 Retrofit installations Page 27

step 5 Setting the travel limits Page 55

Electrical setup

step 6 Electrical setup Page 60

step 6 Connect all wiring page 24

Commissioning and handover

step 7 Setting the travel limits Page 55

step 8 Connecting an external radio receiver and infrared beams Page 59

step 9 Manual operation Page 63

step 10 Installation handover Page 64

IMPORTANT
Safety Instructions

ATTENTION

To ensure the safety of people, it is important that you read all the following instructions. Incorrect installation or incorrect use of the product could cause serious harm to people.

The installer, being either professional or DIY, is the last person on the site who can ensure that the operator is safely installed, and that the whole system can be operated safely.

Warnings for the installer

CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS before beginning to install the product.

- The installation of your new Roller-shutter Operator (herein after referred to as 'RSO') must be carried out by a technically qualified or licensed person. Attempting to install your new RSO without suitable technical qualification may result in severe personal injury, death and/or property damage
- Only install the RSO on a properly balanced and aligned, well functioning shutter (or 'curtain', as it is more commonly known). An improperly balanced or malfunctioning curtain could cause serious injury. Have a qualified person check and, if required, make repairs to your curtain before installing the RSO. As a general rule, your curtain is deemed to be well balanced and aligned if it:
  - Requires an equivalent amount of applied force to manually open and close,
  - Does not rise or fall more than 100mm when stopped at any position between fully open and fully closed positions, and
  - Does not rub or make contact with any supporting or surrounding structures
- Repairs to roller-shutters must only be carried out by technically qualified persons. Attempting to repair the system without suitable technical qualification may result in severe personal injury, death and/or property damage.
- Remove or render inoperative all existing locks and ropes prior to installation of the RSO

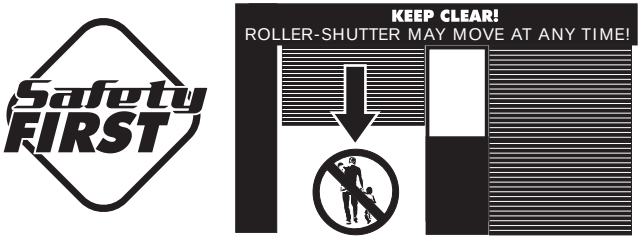
- The helical coil springs must be properly lubricated between all of the coils with heavy automotive bearing grease. Failure to adequately lubricate the springs may result in one or more of the following symptoms;
  - The springs will become rusty over time resulting in extra operating friction between the coils which may cause the RSO to malfunction
  - Seasonal temperature changes may cause the roller-shutter springs to expand and/or contract. The resultant increase and/or decrease in operating friction may cause the RSO to malfunction. Properly lubricating the springs will help to minimise the effects of seasonal temperature changes in operating friction of your roller-shutter
- It is recommended that the manual operation chain is housed within the chain bag included with this kit and positioned in such a way that only authorised users have access to it, so as not to compromise the security of the installation.
- Do not connect the RSO to the power source until this manual instructs you to do so or if safe
- The RSO must be connected to a properly earthed general purpose 220V (380V for certain models) outlet which has been installed by a qualified electrical contractor
- Locate the wall control/pushbutton:
  - Within site of the curtain and,
  - At a minimum height of 1.5 meters above the ground so that it remains out of reach of small children and,
  - Away from all moving parts of the door
- Install warning decals in a prominent position next to the wall control button
- Never use the RSO unless the curtain is in full view and free from objects such as cars, children and/or adults
- Never allow children to operate the RSO
- Never operate the RSO when children/persons are under or near the path of the door. Children must be supervised at all times when near the curtain and when the RSO is in use
- Never attempt to disengage the RSO to manual operation when there are persons and/or other objects including motor vehicles under or near the path of the curtain
- Never attempt to make any repairs or remove covers from the RSO without first disconnecting the power supply cord from the main power supply
- For additional safety we strongly recommend the fitment of safety beams on the RSO models that allow for them, i.e. the RSO5 and RSO5DC. The addition of safety beams will greatly enhance the operating safety of the RSO and provide additional peace of mind.

In some countries it is mandatory and required by law to fit safety beams

- It is the sole responsibility of the owner/installer to fit safety beams in those countries that so require
- Removal of the RSO's protective covers must only be performed by a technically qualified person. Attempting to remove the protective covers or repair the RSO without suitable technical qualification may result in severe personal injury, death and/or property damage
- Always ensure that the curtain is fully open before driving into or out of the building
- Always ensure that the curtain is fully closed before leaving the driveway
- Keep hands and loose clothing clear of the curtain and product at all times
- As the RSO is often installed at great heights, ensure that the necessary scaffolding and safety harnesses are employed and that they are stable and secure
- NEVER PULL THE MANUAL RELEASE PIN IF A PERSON OR OBJECT IS DIRECTLY UNDERNEATH THE CURTAIN

Everything not expressly specified in these instructions is not permitted.

WARNING! WARNING! WARNING! WARNING! WARNING!



MOVING SHUTTER DOOR CAN CAUSE SERIOUS INJURY OR DEATH!

KEEP CLEAR! SHUTTER DOOR MAY MOVE AT ANY TIME!
DO NOT ALLOW CHILDREN TO PLAY IN AREA OR OPERATE
THE ROLLER-SHUTTER OPERATOR!

1. Section left intentionally blank

Please note that this page has been left blank intentionally, and will be updated in the near future

2. Icons used in this manual

This icon indicates tips and other information that could be useful during the installation

This icon denotes variations and other aspects that should be considered during installation

This icon indicates warning, caution or attention! Please take special note of critical aspects that MUST be adhered to in order to prevent injury

3. General description

The CENTURION Industrial RSO range has been designed to safely automate extremely heavy roller-shutter doors such as entrances to factories and loading bays.

There are five models available, each tailor-made to suit individual installation requirements. Each model is equipped with a heavy-duty electric motor that, coupled with a powerful gearbox, delivers maximum lifting force. In addition, a convenient manual override facility comprising a 5m chain ensures that the door can be operated even in the event of a power failure. A three-button wall pendant allows the operator to not only open and close the door but also safely stop it should an emergency situation arise. In addition, the RSO5 and RSO5DC models also allow for the integration of radio receivers, meaning that the door can be operated remotely by means of a hand-held transmitter.

End-of-travel limits are managed by two normally-open limit switches, one for each direction of travel. Therefore there is no need for any unsightly additions to the roller-shutter structure.

The following five models are available:

RSO5R

The RSO5R is ideal for sites requiring simple, cost-effective automation of doors weighing up to 500 kilograms. A three-button wall pendant is used to operate the door, with two normally-open pushbuttons for directional operation and one normally-closed pushbutton used to stop the door.

RSO5R3P

This is a powerful three-phase, 380V operator capable of delivering greater starting thrust than single-phase operators, and also boasts an increased duty cycle.

RSO5

The RSO5 utilises a powerful AC motor to lift doors weighing up to 500 kilograms and a multi-faceted interface board allows for the connection of safety beams, radio receivers, keypads, proximity access systems, etc.

RSO5DC

The RSO5DC incorporates an intelligent logic controller complete with user-friendly LCD interface for easy setup. In addition, two 7Ah batteries provide reliable battery backup, ensuring that the RSO5DC remains in operation even in the event of a lengthy power outage. The controller also makes provision for the connection of ancillary items such as infrared safety beams, proximity readers and keypads.

RSO9

The RSO9 is a heavy duty model utilising a 380V, three-phase power supply enabling it to lift very heavy roller-shutter doors weighing up to 900 kilograms.

4. Specifications

Physical dimensions

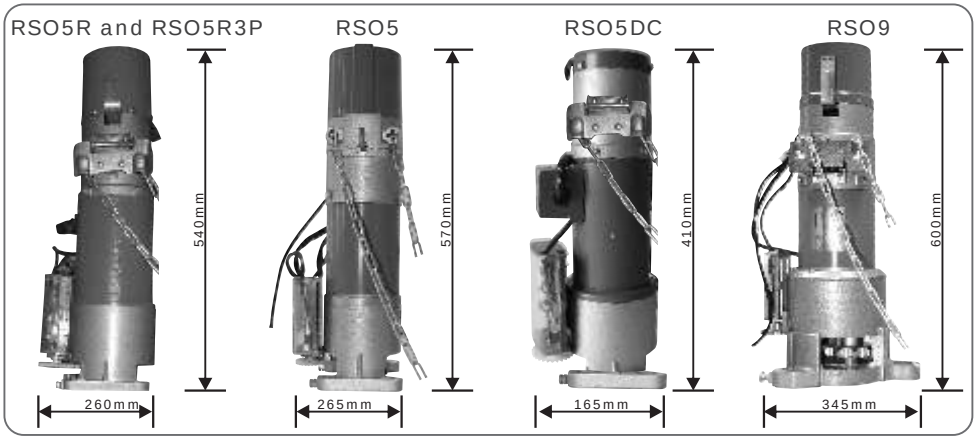


FIGURE 1. OVERALL DIMENSIONS

Technical specifications

	RSO5R	RSO5R3P	RSO5	RSO5DC	RSO9
Supply voltage	220V - 240V AC 50Hz	380V AC 3Ø 50Hz	220V - 240V AC 50Hz	220V - 240V AC 50Hz	380V AC 3Ø 50Hz
Power	360W	360W	360W	220W	550W
Motor speed	1780 rpm	1780 rpm	1780 rpm	1440 rpm	1780 rpm
Current	3.5A 1Ø	2A 3Ø	3.7A 1Ø	4.6A 1Ø	2.2A 3Ø
Temperature protector	95°C	70°C	105°C	70°C	115°C
Output shaft rotation	53 rpm	35 rpm	35 rpm	50 rpm	17 rpm
Gear ratio	34:1	55:1	51:1	55:1	105:1
Material of gear box	Aluminium	Aluminium	Aluminium	Aluminium	Aluminium
Sprocket	9T	9T	9T	9T	10T
Chain	5/8 inches	5/8 inches	5/8 inches	5/8 inches	1 inch
Length	540mm	540mm	570mm	410mm	600mm
Net weight	12.7kg	12.8kg	12.8kg	9.64kg	22.1kg
Gross weight	13.5kg	13.5kg	13.5kg	10.4kg	23.0kg
Packing dimensions (mm)	540 x 260 x 200	570 x 265 x 210	570 x 265 x 210	570 x 265 x 210	600 x 345 x 285
Door speed	140mm per second ±10%	100mm per second ±10%	100mm per second ±10%	140mm per second ±10%	45mm per second ±10%
Door weight	500kg	500kg	500kg	500kg	900kg

5. Determining shutter weight and profile

Roller-shutters with perforated profiles

Profile A

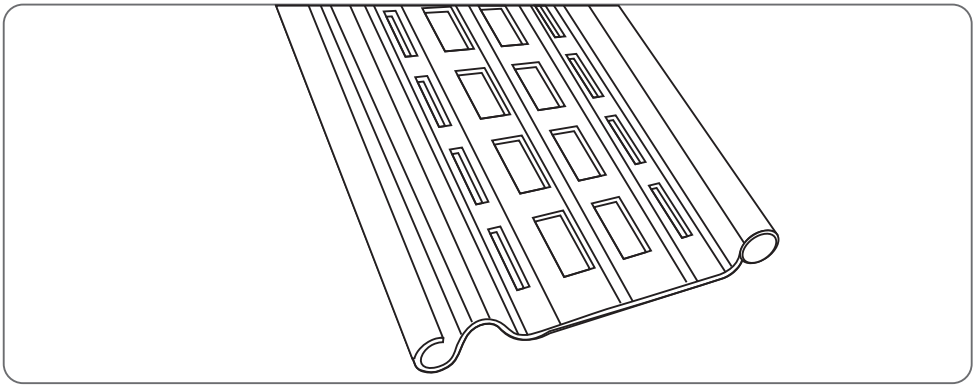


FIGURE 2. PROFILE A

Description	Size of interlocking sections	Thickness	Weight per square metre
Steel profile consisting of galvanised steel sheets	105mm	0.5mm	4.5kg

Profile B

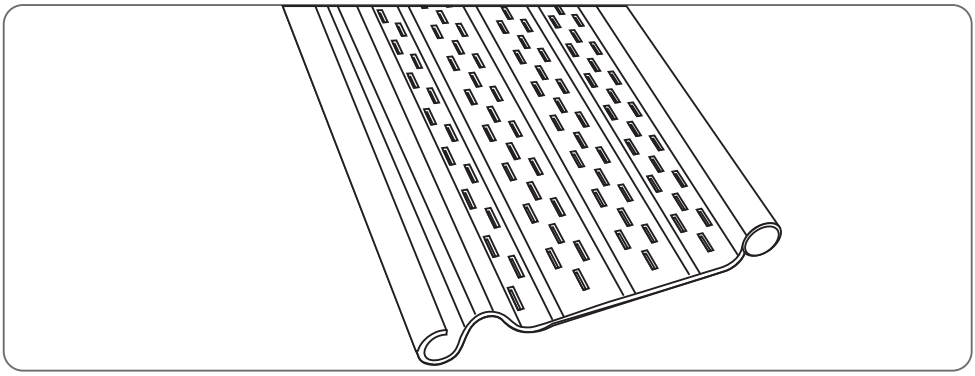


FIGURE 3. PROFILE B

Description	Size of interlocking sections	Thickness	Weight per square metre
Steel profile consisting of galvanised steel sheets with high-density micro-perforations of 4mm diameter	105mm	0.5mm	5.5kg
		0.7mm	7.7kg

Profile C

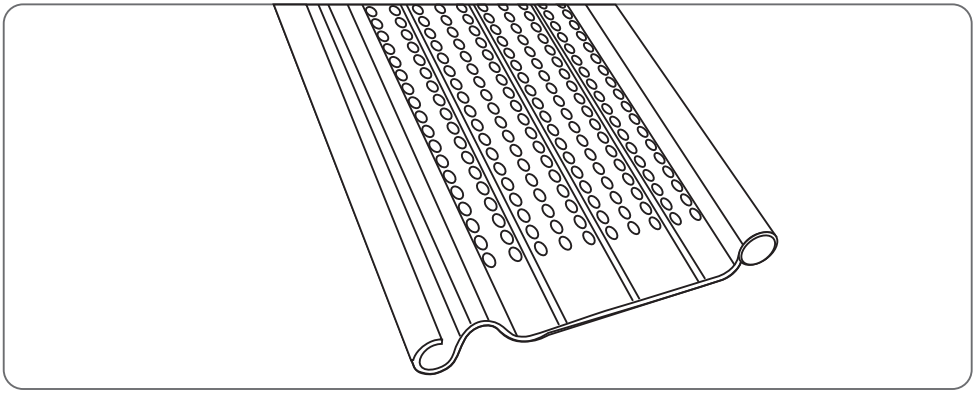


FIGURE 4. PROFILE C

Description	Size of interlocking sections	Thickness	Weight per square metre
Steel profile consisting of galvanised steel sheet with high-density micro-perforations of 2.5mm diameter	105mm	0.7mm	7.7kg

Roller-shutters with flat blind steel profiles

Profile D

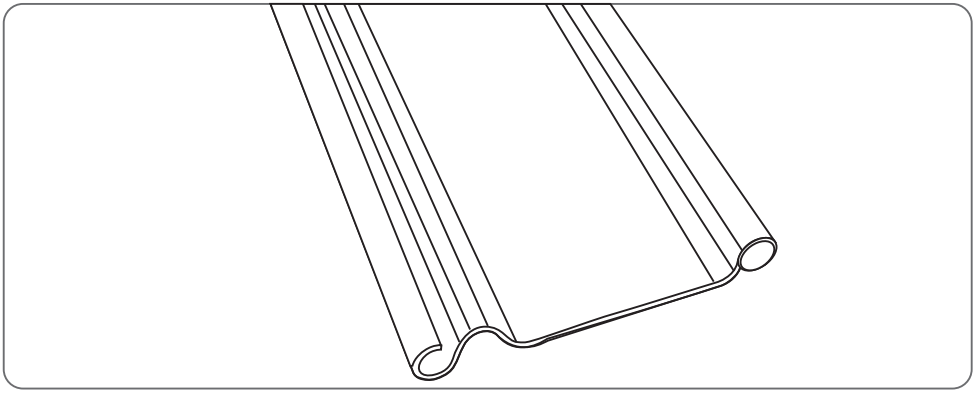


FIGURE 5. PROFILE D

Description	Size of interlocking sections	Thickness	Weight per square metre
Steel profile consisting of galvanised steel sheets	77mm	0.5mm	6.6kg

Profile E

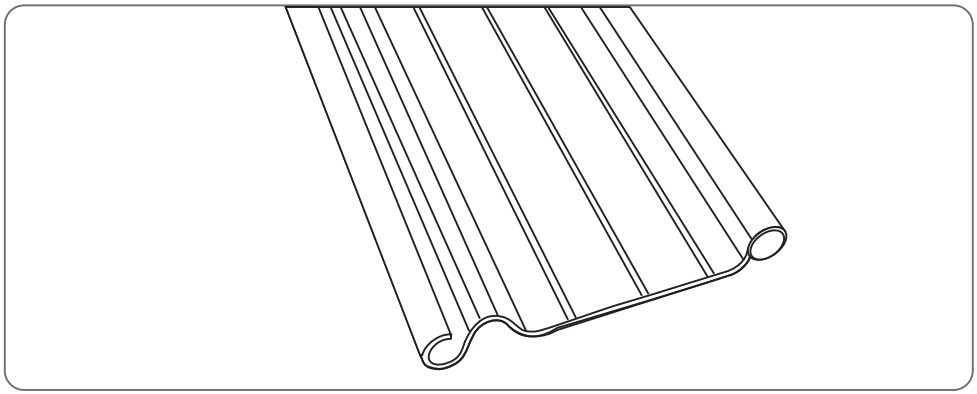


FIGURE 6. PROFILE E

Description	Size of interlocking sections	Thickness	Weight per square metre
Steel profile consisting of galvanised steel sheets	105mm	0.5mm	6kg
		0.7mm	8.4kg
		0.8mm	9.6kg

6. Product identification

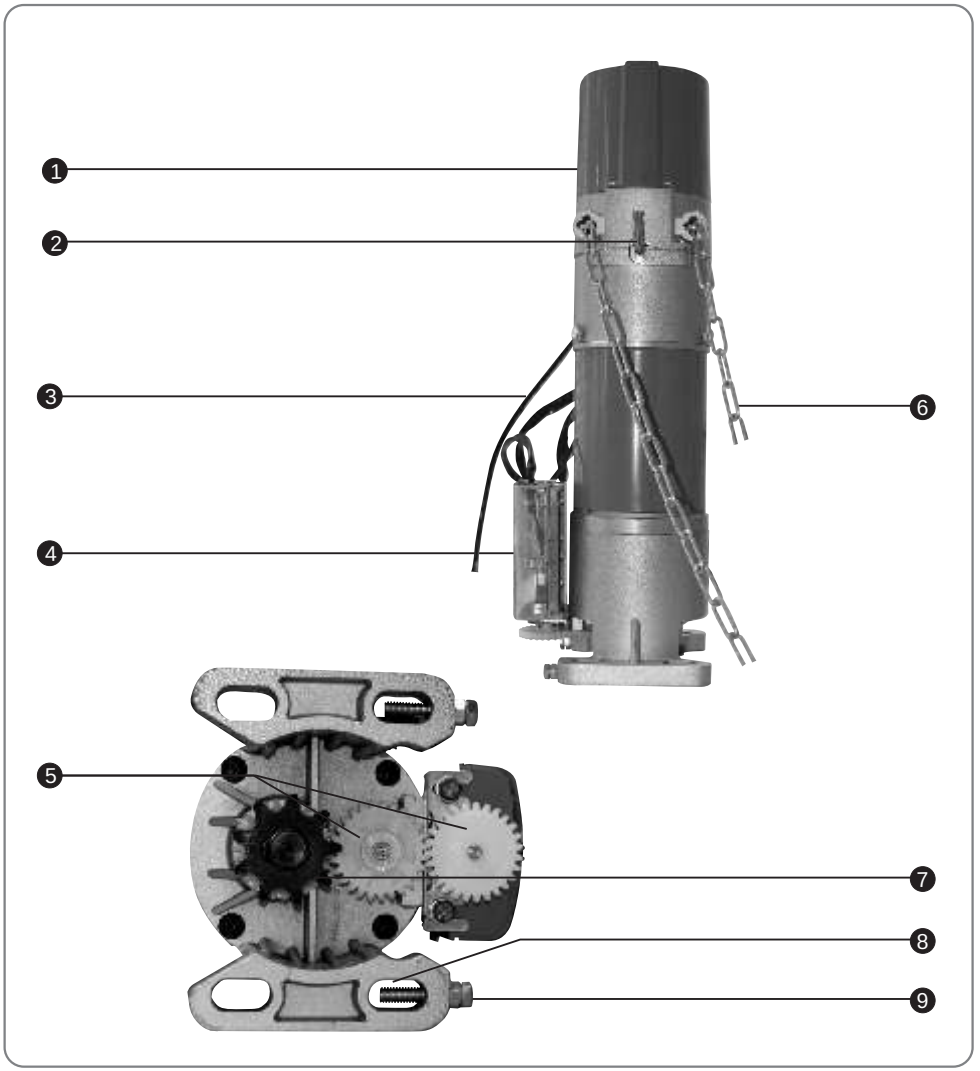


FIGURE 7. PRODUCT IDENTIFICATION RSO5, RSO5R and RSO5R3P

1. Relay/PCB housing
2. Manual override pin
3. Power cable
4. Limit switch housing
5. Limit switch drive
6. Manual operation chain
7. Drive sprocket
8. Mounting Slot
9. Tensioning bolt

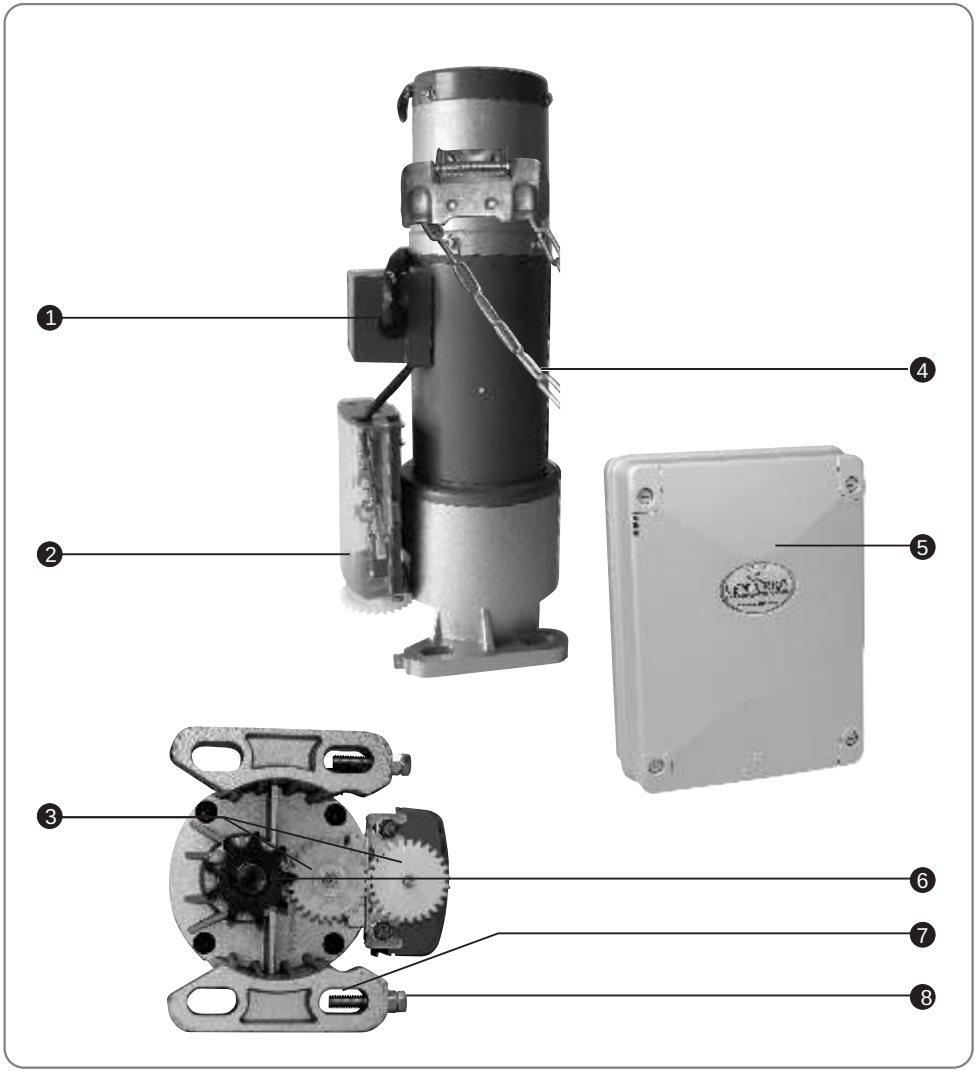


FIGURE 8. PRODUCT IDENTIFICATION RSO5DC

1. Cable junction enclosure
2. Limit switch housing
3. Limit switch drive
4. Manual operation chain
5. Controller box
6. Drive sprocket
7. Mounting slot
8. Tensioning bolt

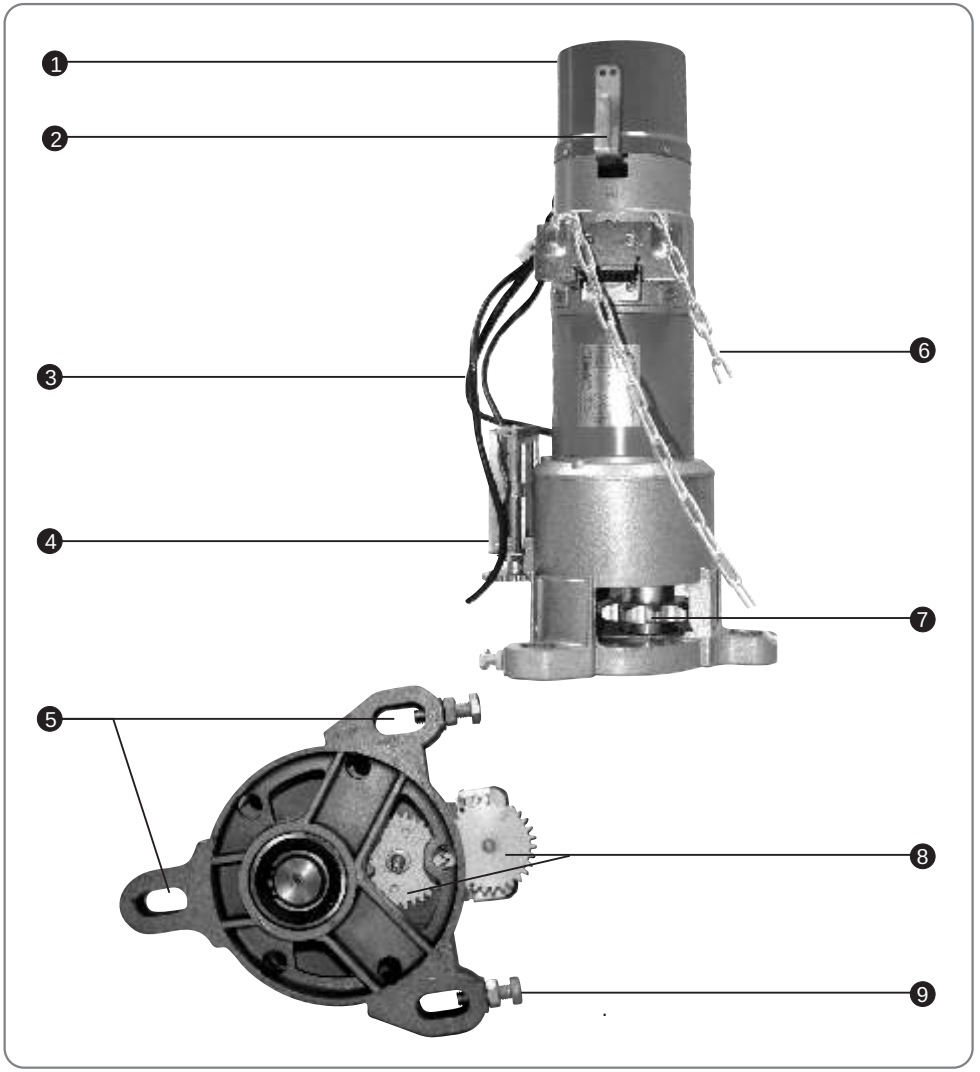


FIGURE 9. PRODUCT IDENTIFICATION FOR RSO9

1. Terminal housing
2. Manual override pin
3. Power cable
4. Limit switch housing
5. Mounting slots
6. Hand chain
7. Drive sprocket
8. Limit switch drive
9. Tensioning bolt

7. Description of terminal functions

Opening the enclosure

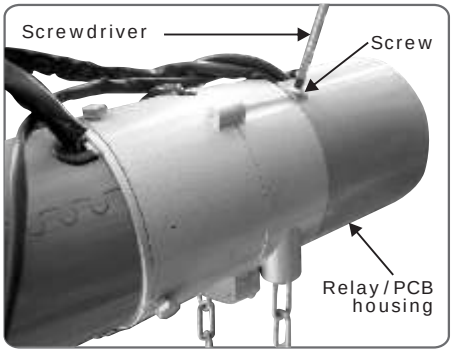


FIGURE 10

To access the motor electronics, open the relay/PCB housing by loosening the four screws holding it in place

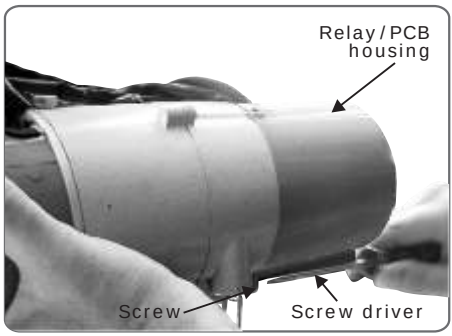


FIGURE 11

Motor controller for RSO5 only

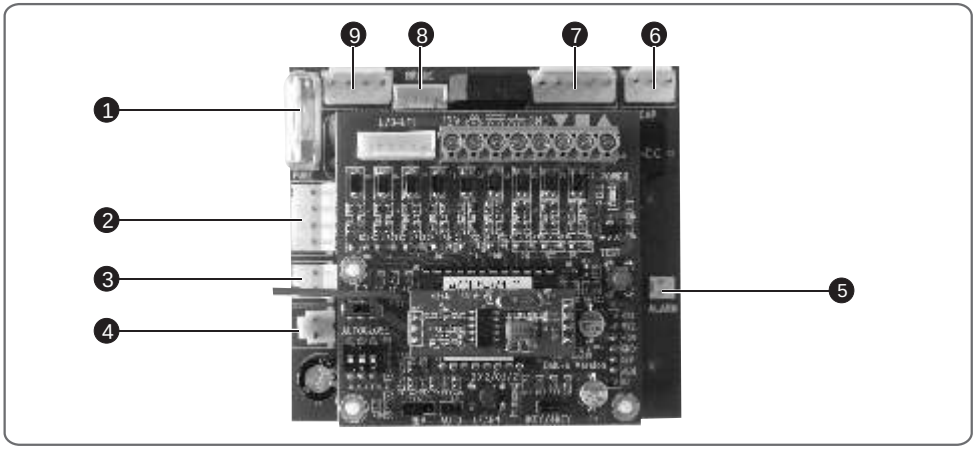


FIGURE 12. AC-L5-B MOTOR CONTROLLER BOARD

Symbol	Function
1. FUSE	Motor fuse 5A
2. TR1	AC Output
3. TR2	AC 12V input
4. TEMP-FS	Thermal cut-out terminal
5. ALARM	Not used
6. CAP	Capacitor terminal
7. MOTOR	Motor cable terminal
8. BRAKE	Internal disc break terminal
9. POWER	AC power terminal

FUSE	Motor fuse (5A F/B)
TR1	Provides 220V AC to PCB transformer
TR2	12V AC input from the transformer
CAP	Capacitor Terminal. The motor capacitor is connected to this three-pin connector
MOTOR	Motor output. Connects to the motor wires.
BRAKE	This output provides power to the operator's internal disc break
TEMP-FS	The motor's temperature cut-out switch is connected to this terminal and will activate in the event of over-temperature
POWER	The 220V -240V AC main power supply is connected to this terminal
ALARM	Not used

Interface board for RSO5 only

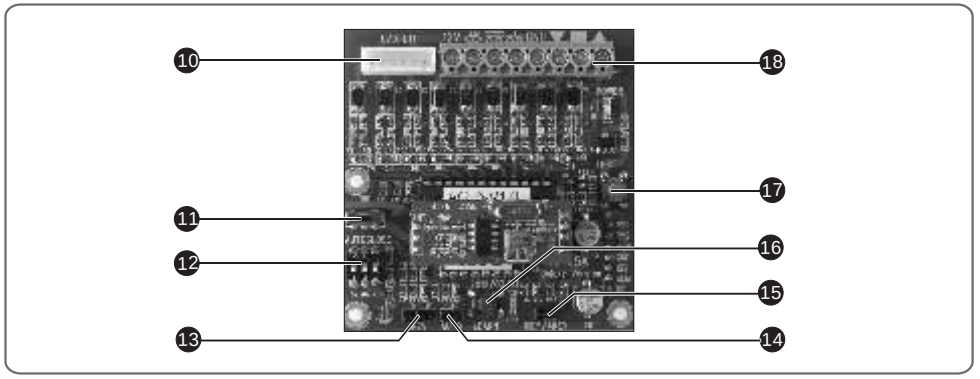


FIGURE 13. AC-L5-A MOTOR CONTROLLER

Symbol	Function
10. LIMIT S/W	Limit Switch terminal
11. DIR	Motor Drive direction switch
12. AUTOCLOSE	Automatic closing time adjustment
13. REV	Infrared Beams Mode selection pins
14. AUTO	Dead man control
15. ONE-KEY/FOUR-KEY	Not used
16. LEARNING PB	Not used
17. TEST	Single button operation
18. G ↑STOP ↓	I/O terminal

TEST	Onboard door operation button. This button acts as a trigger. From the fully closed position, pressing the button once will cause the door to start opening, pressing it a second time will stop the door and a third button press will cause the door to start closing
GND	Ground, common or 12V negative termination point
	Operates in a similar fashion to the onboard test button. A pulse on this input will, from the fully closed position, cause the door to start opening. A second pulse will stop the door and a third pulse will cause the door to reverse direction and start closing

	This is a normally-open, potential-free contact which will upon closing of the contact (i.e. the beams being broken) cause the curtain to react in one of the following ways: If the REV jumper pins closest to the AUTO jumper have been bridged, the door will stop immediately once the beams have been blocked, regardless of the direction of travel. If the REV pins furthest from the AUTO jumper are bridged and the beam interrupted, the controller will react by emitting a series of beeps and then cause the curtain to re-open for 5 seconds. Should the beam be interrupted again the curtain will stop immediately. If the beams are interrupted while the door is opening the door will stop. If none of the REV pins are bridged and the beam is interrupted while the door is closing, the controller will react by emitting a series of beeps and then cause the curtain to re-open all the way to the open limit. Should the beams stay interrupted the curtain will run in the opening direction for 5 seconds and then stop. If the beams are interrupted again while the door is opening the door will stop.
12V	This terminal provides +12V DC supply for auxiliary equipment such as a radio receiver, photo cells, etc. Maximum 300mA
	Closing Input. Momentarily connecting this input to GND will cause the door to travel in the closing direction
	Stop Input. Momentarily connecting this input to GND will cause the door to stop moving immediately
	Opening Input. Momentarily connecting this input to GND will cause the door to travel in the opening direction
DIR	Motor drive direction selection. Confirm the motor direction by using the OPEN, STOP and CLOSE buttons. If the drive direction is incorrect (i.e. the OPEN button closes the door or vice versa), move the switch marked DIR to change the drive direction. Use the controller buttons again to confirm
REV ON/OFF	Configures the way in which the curtain will react upon the beam being broken (if beams are connected). If the REV jumper pins closest to the AUTO jumper have been bridged, the door will stop immediately once the beams have been blocked, regardless of the direction of travel. If the REV pins furthest from the AUTO jumper are bridged and the beam interrupted, the controller will react by emitting a series of beeps and then cause the curtain to re-open for 5 seconds. Should the beam be interrupted again the curtain will stop immediately. If the beams are interrupted while the door is opening the door will stop. If none of the REV pins are bridged and the beam is interrupted while the door is closing, the controller will react by emitting a series of beeps and then cause the curtain to re-open all the way to the open limit. Should the beams stay interrupted the curtain will run in the opening direction for 5 seconds and then stop. If the beams are interrupted while the door is opening the door will stop.

AUTO	Enabling the Auto functionality allows the user full control over the curtain's closing cycle; in other words, an opening cycle can still be initiated by pressing the Up button only once, but the curtain will only close if the Down button is pressed and held. Releasing the Down button will cause the curtain to stop immediately:
AUTOCLOSE	Automatic closing switches. These dipswitches set the time for which the door must remain open before Autoclosing. The Autoclose timer will start counting down upon the door reaching the fully open position. Autoclose time can be set for 5 seconds to 65 seconds, by configuring the dipswitches as follows:

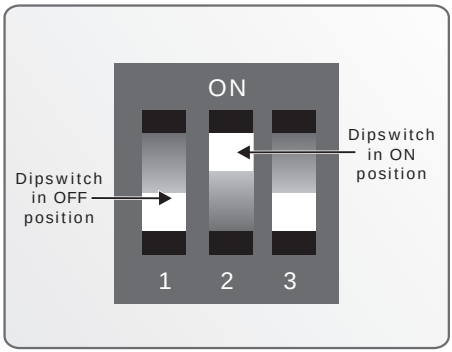


FIGURE 14. AUTOCLOSE JUMPERS

Setting	DIP 1	DIP 2	DIP 3
OFF	Off	Off	Off
5 seconds	On	Off	Off
20 seconds	Off	On	Off
25 seconds	On	On	Off
40 seconds	Off	Off	On
45 seconds	On	Off	On
60 seconds	Off	On	On
65 seconds	On	On	On

Infrared safety beams must be installed if Autoclose is to be used

RSO5DC Controller

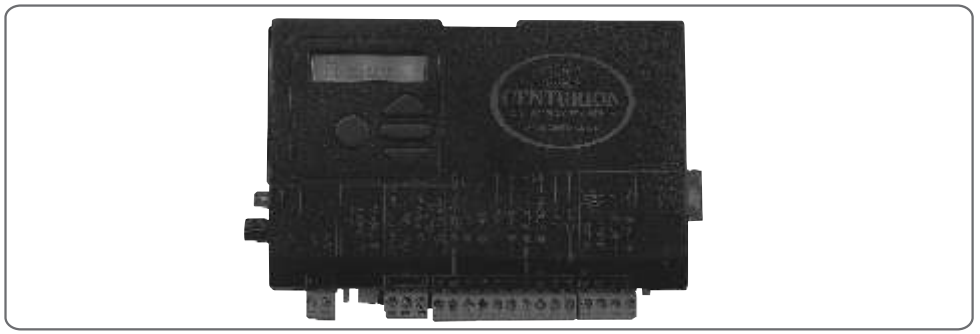


FIGURE 15. RSO5DC CONTROLLER

24V +	Positive battery connection. (Battery terminal normally indicated as + or RED)
24V -	Negative battery connection. (Battery terminal normally indicated as - or BLACK)
Motor	Motor output – Connects to the Blue or Black motor wire
Motor	Motor output – Connects to the Orange or Red motor wire
Com	The common termination point. All trigger signals, etc. have their return path to one of the Com terminals.
Status	External shutter status indicator.(A low current output signal.) An output terminal which provides a low current, drive (approx. 4,5V DC, 20mA) to a LED which can be used to indicate the shutter status remotely. If more than three LEDs are required it is necessary to fit the CP78 MULTI LED driver card
Aux	This terminal connects to the RSO5DC's internal solenoid brake. The brake releases whenever the operator receives a trigger signal, and acts as a safety mechanism in the event that the shutter's counterbalance springs fail, engaging and keeping the shutter stationary to prevent it from free-falling
FRX	Free-exit input. (A normally-open potential-free input). Momentarily connecting this input to COM will cause a shutter which is closed, or closing, to open or re-open. If the shutter is open, or opening, the signal has no effect other than to reset the Autoclose timer (if selected). Free-exit (FRX) never initiates a closing cycle. The only way to close a shutter if only the FRX input is used, is to activate the Autoclose feature on the controller.

Com	The common termination point. All trigger signals, etc. have their return path to one of the Com terminals.
Ped	Pedestrian opening input. (A normally-open potential-free input). Momentarily connecting this input to COM will cause the shutter to open to the Pedestrian open position. For more information refer to the Pedestrian feature.
Trg	Trigger input. (A normally-open potential-free input) Momentarily connecting this input to COM will cause the shutter to open or close depending on the operating mode selected. For more information see the Autoclose feature and Modes of Operation.
Lck/Stp	Holiday Lockout or gate stop input. (A normally-closed potential-free input). For as long as a connection between this input and COM is maintained the controller will behave normally. But, when this connection to COM is broken all inputs are inhibited, and if the shutter is moving it will stop. If the Lck function is not required a link must be fitted between Lck and Com
Safety Open	Opening beam safety input. (A normally-closed potential-free input). As long as a connection between this input and Safe Common is maintained the controller will behave normally. When this connection is broken it will prevent the gate from opening if it is stationary, and will stop and close the gate if it is opening. This input has no effect if the gate is closing. When setting up the controller for the first time or after a full reset back to factory defaults has been performed, the system will electronically override the Safety Inputs and allow the system to function without the links. However if safeties are connected to either or both inputs, thereafter there must be a normally-closed circuit maintained for the system to operate correctly. I.e. if beams are fitted and then removed, the circuit which is affected must be replaced with a wire link to create the normally-closed circuit.
Safety Close	Closing edge safety input. CLOSING edge safety input. (A normally-closed potential-free input). For as long as a connection between this input and COM is maintained the controller will behave normally. When this connection is broken it will prevent the shutter from closing if it is stationary, and will stop and reverse the shutter if it is closing. This input has no effect if the shutter is opening If the Saf CLO function is not required a link must be fitted between Safe CLO and COM for the controller to operate normally.)

Aux 12V Out	Auxiliary power connection. Auxiliary power connection. Provides a +12V DC supply for auxiliary equipment such as a radio receiver, photo cells etc, It is linked directly to the battery positive via a 3A resettable fuse.
Safe Com	Used for switching the power supply to the safety beams. If automatic beam testing is required, the negative power supply connection of the beam transmitters and receivers must be wired to this point.
LIT	Pillar light connection. These two terminals provide a normally-open, potential-free contact which is generally used to switch on a pillar light (courtesy light). This contact is fuse protected – refer to pg48 for fuse specifications

8. Required tools and equipment

- Welding equipment
- Spanner 17mm; 13mm
- Spirit level
- Circlip pliers
- Allen key set
- Long-nosed pliers
- Angle grinder and cutting discs
- Electric drilling equipment
- Masonry bits for mounting wall pendant
- Steel bits
- Phillips screwdriver
- Marking pen/chalk
- Extension cord
- G-Clamps
- Depending on the height at which the RSO is to be installed, scaffolding and safety harnesses may be needed
- Gear puller for removing old sprocket

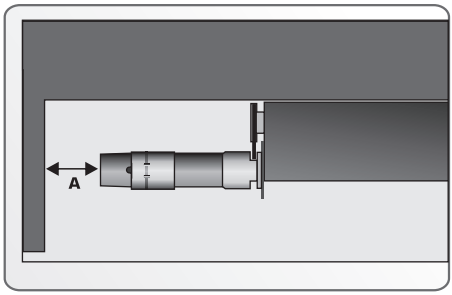
9. Preparation of site

General considerations for the installation

- Gather all necessary tools and assemble any scaffolding and safety equipment that may be required to safely gain access to the area where the RSO is to be installed
- Ensure that the door is properly balanced by manually opening it halfway. It should ideally remain in this position and should not move of its own volition for more than about 100mm of travel in either direction
- Fully open the door to be automated and ensure that it is securely locked in place. This is imperative since the door could free-fall which could lead to personal injury or even death

Minimum clearance

Operator	Minimum A dimensions
RSO5R	590mm
RSO5R3P	590mm
RSO5	620mm
RSO5DC	460mm
RSO9	650mm



The A dimension refers to the minimum amount of space needed to install each operator, i.e. the distance from the side of the shutter box to the first obstruction (eg. a pillar)

10. Cabling requirements

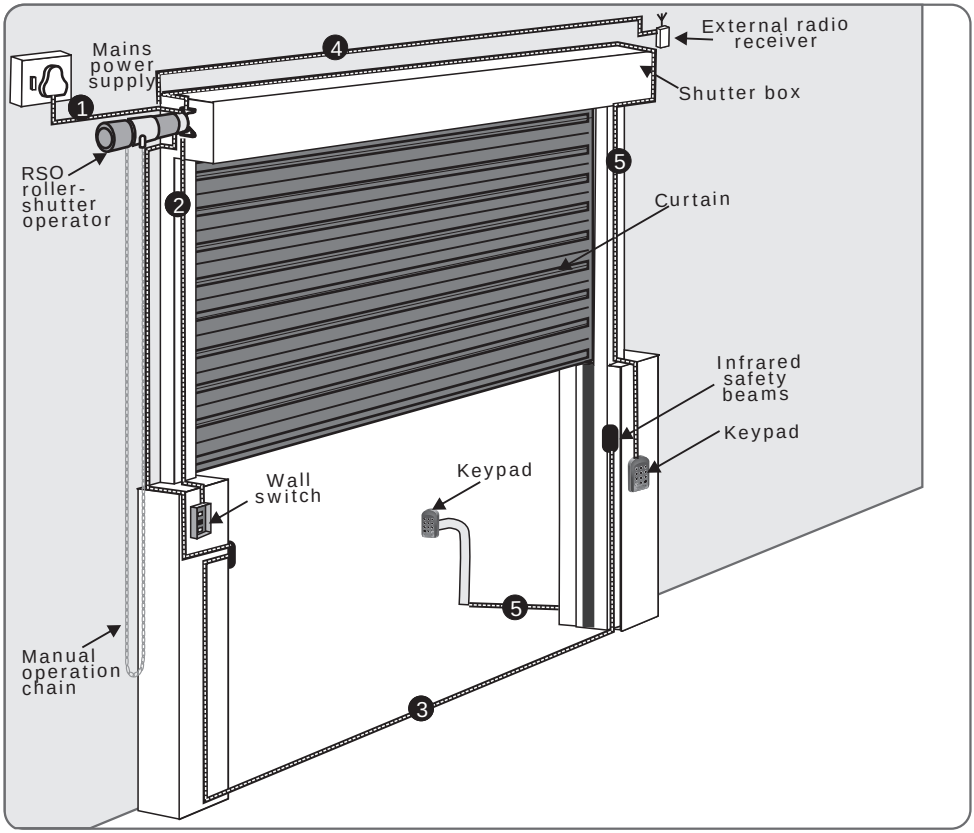


FIGURE 16. CABLING REQUIREMENTS

1. 220V - 240V* AC mains cable (3 core LNE 1.5mm² SWA).
2. Cable for wall switch (supplied).
3. Optional but recommended infrared safety beams (3 core 0.5mm² multi-stranded).
4. Radio receiver cable (3 core 0.5mm² multi-stranded).
5. Optional keypad (3 core 0.5mm² multi-stranded).

* 380V AC 3Ø for three phase models

RSO5DC cabling requirements

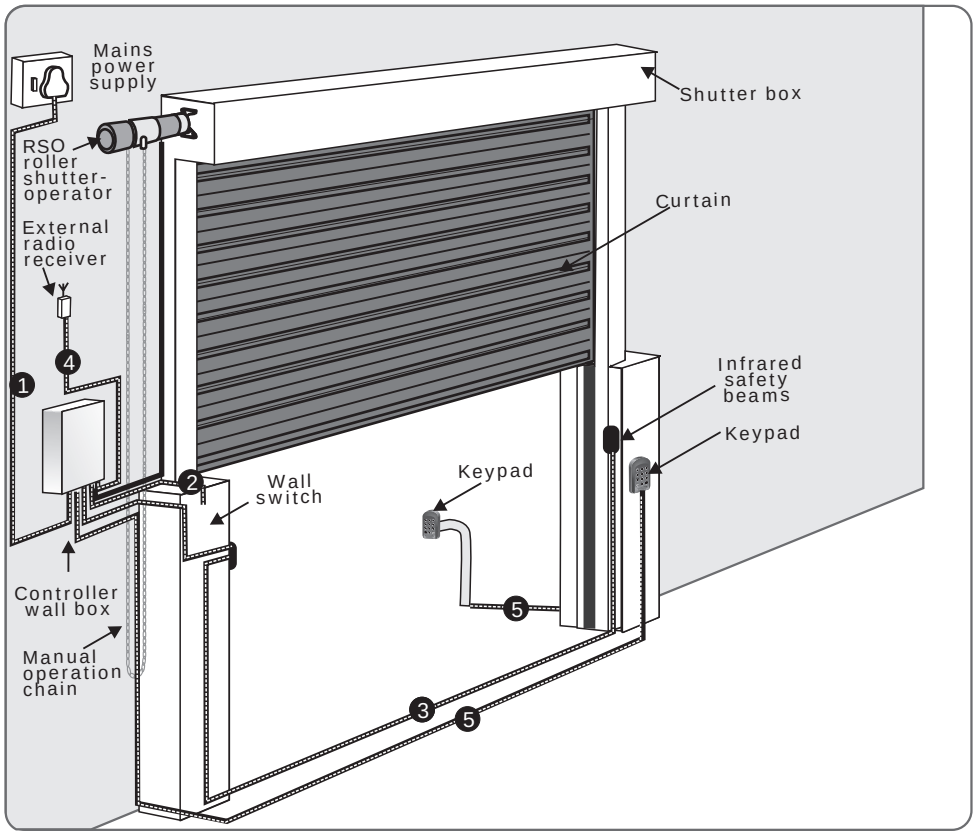


FIGURE 17. CABLING REQUIREMENTS FOR RSO5DC

1. 220V - 240V* AC mains cable (3 core LNE 1.5mm² SWA).
2. Cable for wall switch (supplied).
3. Optional but recommended infrared safety beams (3 core 0.5mm² multi-stranded).
4. Radio receiver cable (3 core 0.5mm² multi-stranded).
5. Optional keypad (3 core 0.5mm² multi-stranded).

* 380V AC 3Ø for three phase models

11. Installation procedure

Retrofit installations

The following installation procedure applies to roller-shutter doors that have already been installed, and must now be automated:

1. Using a G-clamp, secure the curtain in the fully OPEN position.

It is recommended that the installation is performed while the curtain is open, as the helical coil springs are under the least amount of tension in this position. Working on a roller-shutter while the springs are fully tensioned holds significant safety risks as the shutter could come loose with great force at any moment, resulting in personal injury or even death

2. Remove the chain wheel by loosening the bolt holding it in place; this is commonly a M8 bolt but can be any size.
3. After removing the chain wheel, unhook the manual operation chain from the drive
4. Remove the old sprocket. The sprocket is commonly held in place by a circlip but, as the sprocket often sits quite tightly on the shaft, it is at times necessary to make use of a gear puller in order to remove it.
5. In order to provide adequate space for the RSO to be installed, some or all of the old fittings or support struts may have to be grinded off. Ensure that the surface is completely smooth and that there are no uneven areas or protrusions where the motor is to be installed as shown in Figure 18.

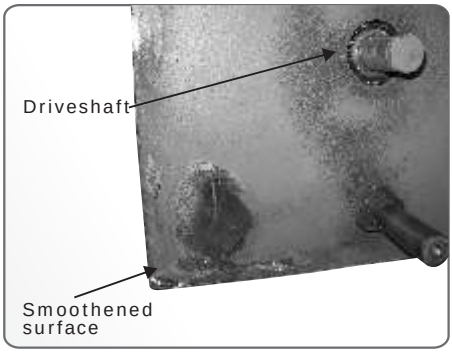


FIGURE 18

6. Using a spirit level, position the steel base plate. When you are satisfied that the plate is in the correct position, weld it in place. Figure 19 illustrates the recommended distance that the base plate must be mounted from the sprocket.

This distance assumes that a drive chain comprising 24 links is used

\# RSO5 range = 120mm
RSO9 range = 190mm

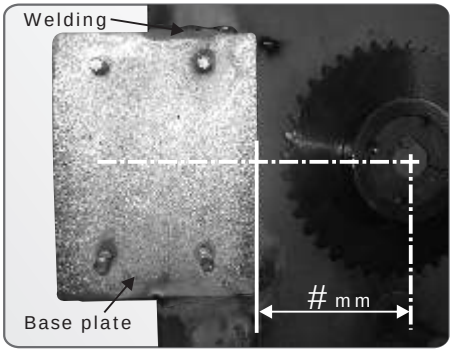


FIGURE 19

7. Insert the taper bush into the sprocket as shown in Figure 20 and use the two grub screws to secure the bush in place.

If at any stage the taper bush must be removed, remove both of the grub screws and insert one of them into the previously unused slot, and tighten

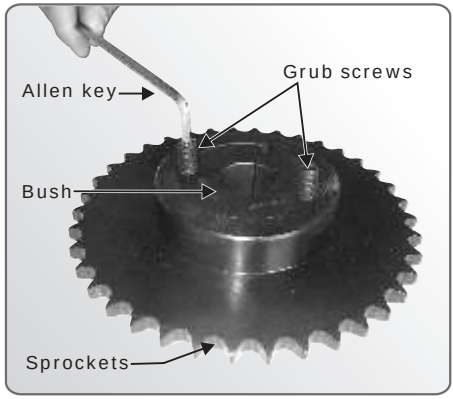


FIGURE 20

8. Fit the sprocket supplied with the RSO kit onto the door's driveshaft and insert the square key(not supplied) into the slot as shown in Figure 21.

Ensure that you purchase the correct taper bush size. Both 30mm and 35mm taper bushes are available

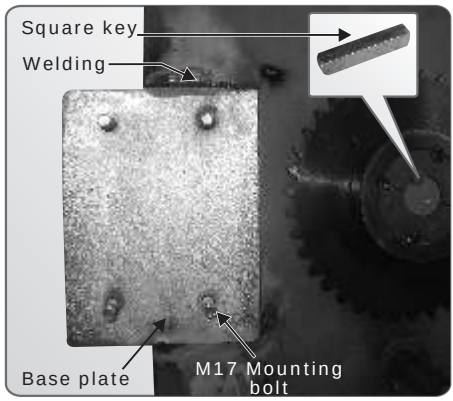


FIGURE 21

9. Always ensure that the hand chain hangs vertically. If the operator cannot be mounted in a way that facilitates this, the chain housing can be swivelled by loosening the three M8 bolts as shown in Figure 22.

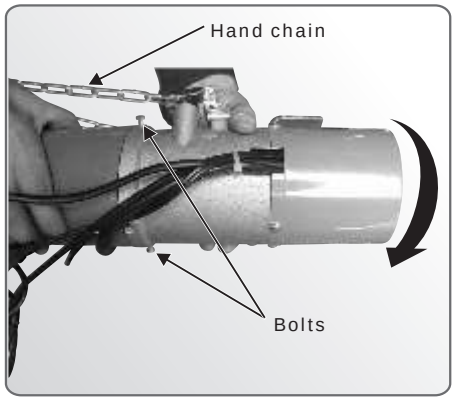


FIGURE 22

10. The motor can now be fitted onto the four mounting bolts. Do not tighten the nuts yet, as the motor must still be positioned in such a way that it tensions the drive chain. Ensure that the motor's output pinion is directly in line with the sprocket as misalignment may result in the chain being pulled from the sprocket once the door is set in motion. Additional washers may be fitted onto the mounting bolts and the motor slightly raised from the plate in order to align the pinion with the sprocket.

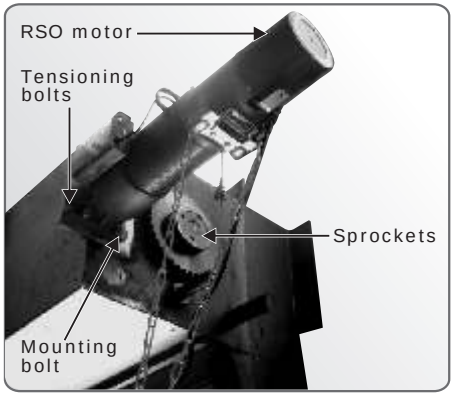


FIGURE 23

Remove the safety clip from the drive chain and break the chain as shown in Figure 24, before connecting it to the pinion

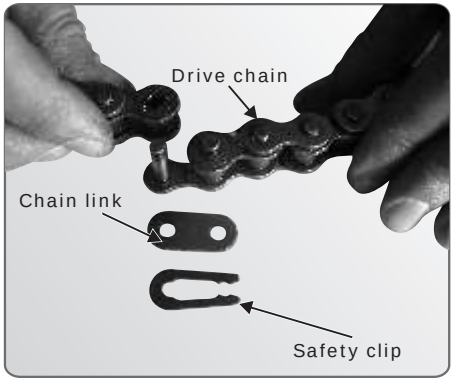


FIGURE 24

11. Connect one end of the drive chain to the pinion and use the manual operation chain to feed it.
12. Use a pair of long-nosed pliers to join the two ends of the chain, remembering to fit the safety clip.

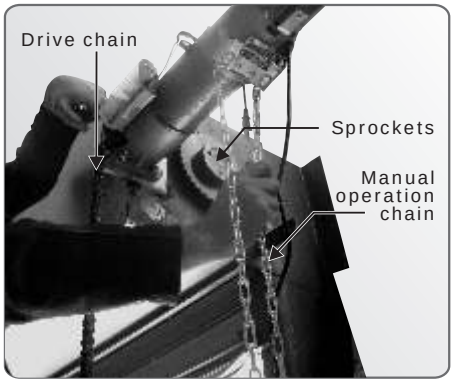


FIGURE 25

12. Electrical setup

Secure wall pendant

Mount the Three-Button Wall Switch in such a way and at such a height that it can be comfortably operated. An optional, lockable enclosure can be purchased from Centurion Systems for added security and to prevent unauthorised and unsafe use of the operator.

- Separate the two halves of the Wall Switch Enclosure by loosening the two fixing screws on the face
- Secure the posterior (back) half to the wall using the most appropriate means, be it rawlbolts, sleeve anchors, etc.
- Fit the anterior (front) of the enclosure assembly to the back plate and secure using the two fixing screws provided

Connect all wiring

Connect all cables as required according to the wiring diagram shown in Figure 25

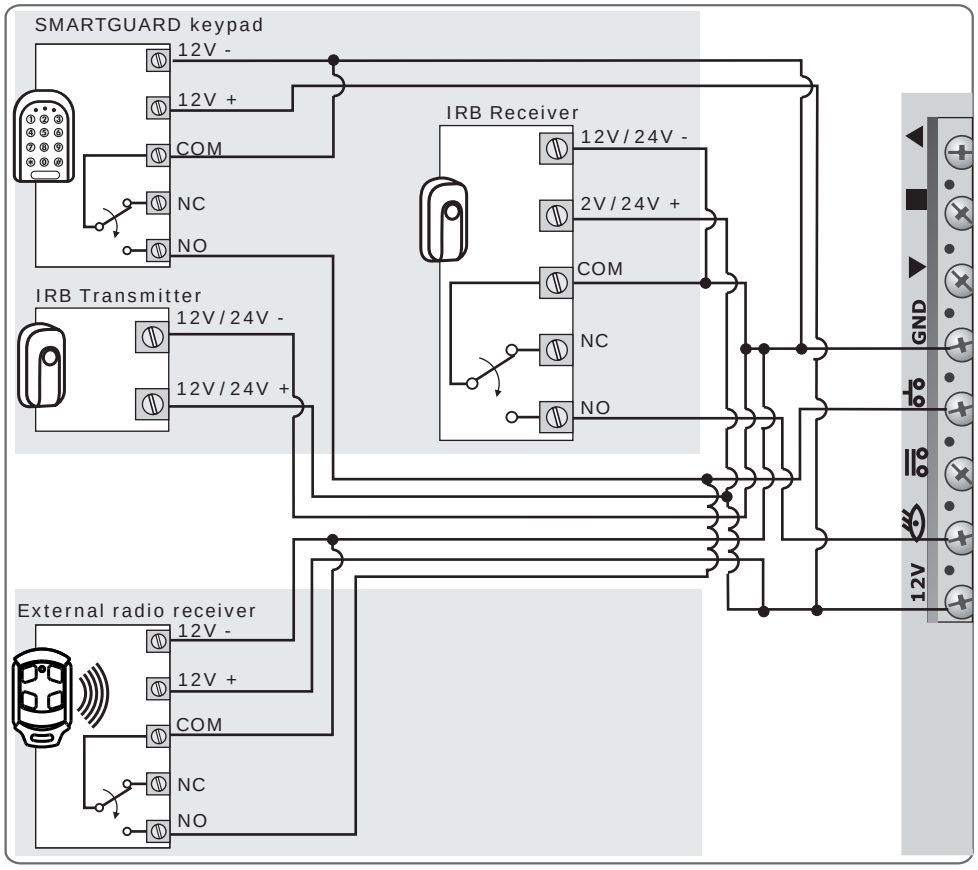


FIGURE 25. RSO5 WIRING DIAGRAM

RSO5DC connections and wiring

1. Secure the control box to the wall using the most appropriate means.

   Be sure to position the wall box so as not to cause any hazards during and after the installation:

   Preferably mount the wall box:

   - Out of direct sunlight
   - At a comfortable working height

2. Crimp the supplied bullet lugs onto the 0.5mm² white, yellow and green wires.
3. Route the three wires through one of the compression glands supplied and then through the knock-out at the bottom of the wall box.
4. Connect the wires from the operator to the wires from the controller in the following configuration:

   - Green – green
   - Yellow – yellow
   - White – white

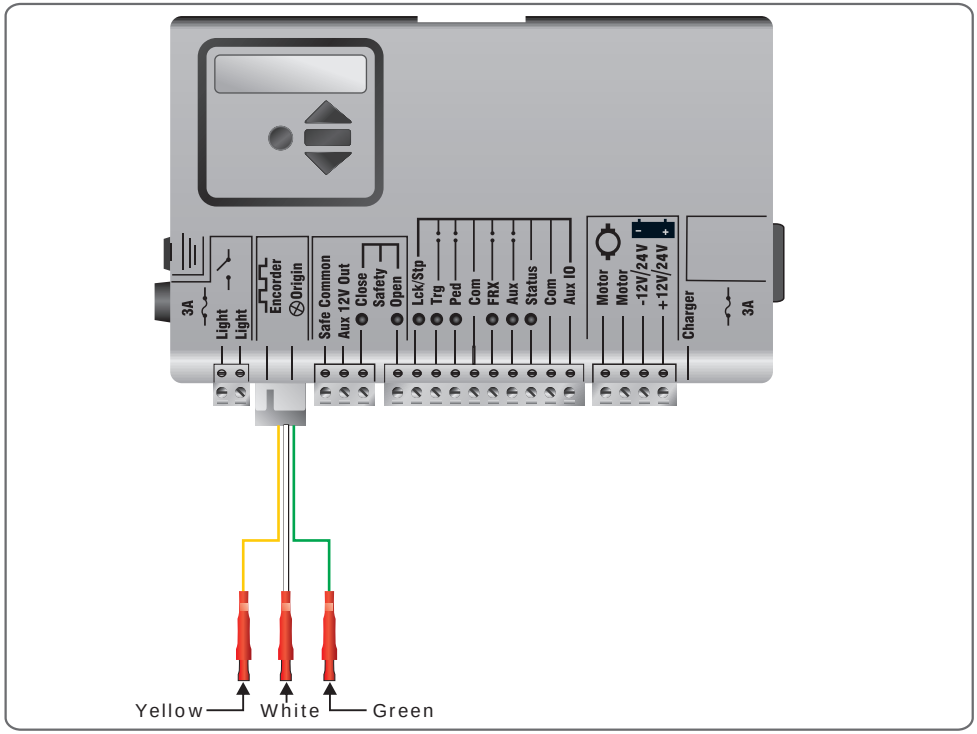


FIGURE 26

4. Connect the two black motor wires to either one of the Motor terminals on the controller (the Motor terminals are not polarity-sensitive).
5. Connect the two red motor wires to the remaining Motor terminal.

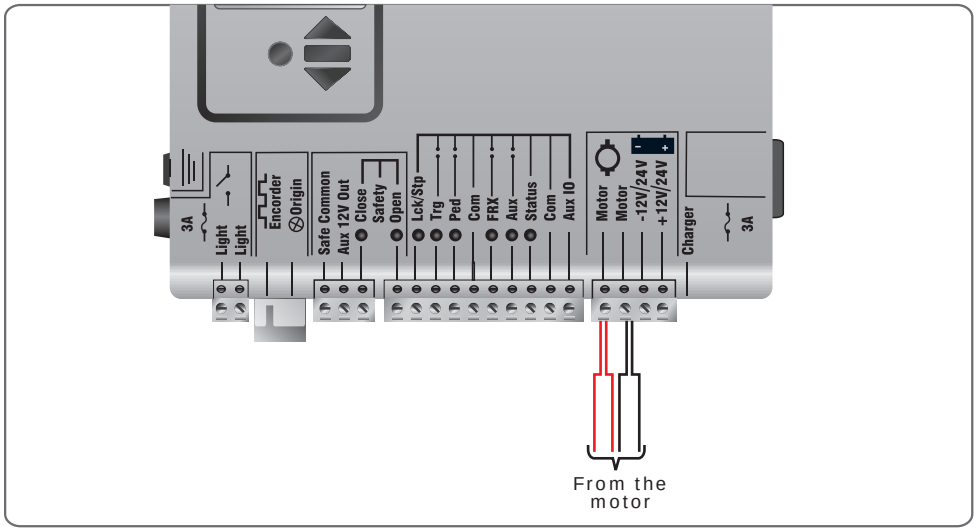


FIGURE 27.

6. Now connect either of the two 0.2mm² yellow wires to the relay card's normally-open (N/O) terminal. The relay card is also housed within the wall box enclosure.

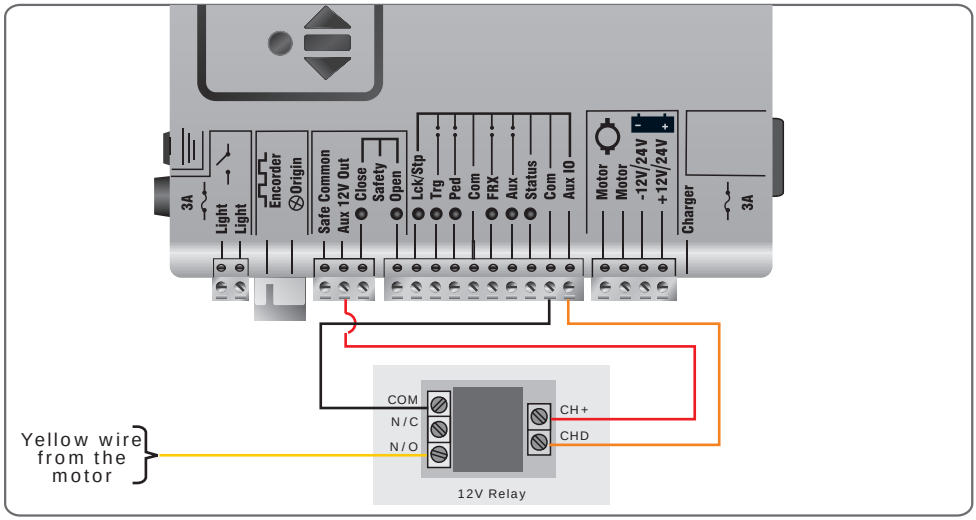


FIGURE 28.

7. Connect the other yellow wire by crimping it into the female blade connector (supplied) and then connecting it to the positive (+) battery terminal via the male 3-way blade expander as shown in Figure 29

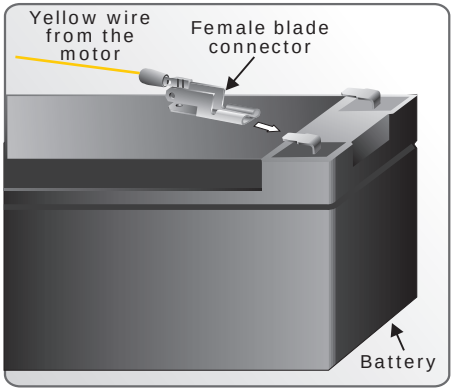


FIGURE 29

8. Heeding the necessary safety precautions, connect the 220 – 240V AC mains supply to the wall box isolator. To access the wiring terminals of the isolator, unscrew the two Philips screws and connect the Live and Neutral wires.

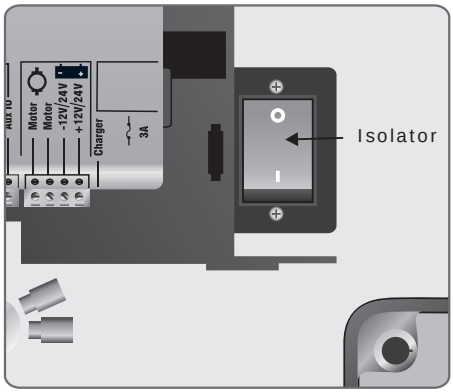


FIGURE 30

9. Fasten the 220V earth cable onto the earth stud in the wall box enclosure as shown in Figure 31

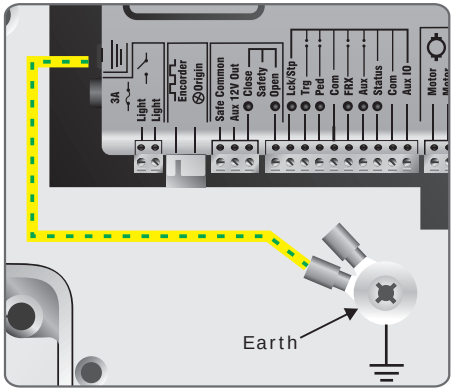


FIGURE 31

10. Connect the two batteries to the controller as shown in Figure 32.

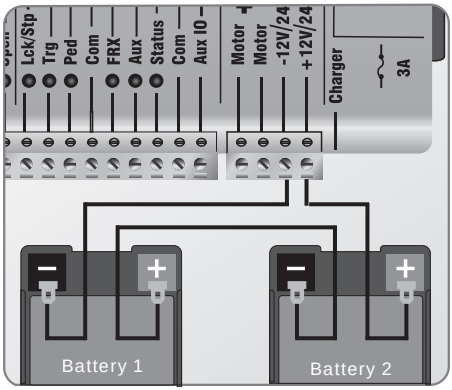


FIGURE 32

RSO5DC menu navigation map

1. Setting limits
   - 1.1. Setup wizard

2. Safety
   - 2.1. Collision force
     - 2.1.1. Opening collision force
     - 2.1.2. Closing collision force
   - 2.2. Collision count
   - 2.3. Alarm output
   - 2.4. LCK as ESTOP
   - 2.5 External gate status indication
     - 2.5.1. Indicator output
     - 2.5.2. Closed indication
     - 2.5.3 Part close indication
     - 2.5.4 Closing indication
     - 2.5.5. Part open indication
     - 2.5.6. Opening indication
     - 2.5.7. Open indication
     - 2.5.8 Pedestrian indication
     - 2.5.9 Unknown indication

3. Autoclose
   - 3.1. Autoclose status
   - 3.2. Autoclose timer
   - 3.3. Autoclose override
   - 3.4. Autoclose advanced options
     - 3.4.1. Autoclose fully open
     - 3.4.2. Autoclose partly open
     - 3.4.3. Autoclose partly closed

4. Modes of Operation
- 4.1. Operating mode
  - 4.1.1. Standard Mode
  - 4.1.2. Condominium Mode
  - 4.1.3. Reversing Mode
  - 4.1.4. PLC
  - 4.1.5. Deadman Control Mode

5. Run profile
- 5.1. Positive close
  - 5.1.1. Positive Close Mode status
  - 5.1.2. Positive Close Mode force
- 5.2. Pre-open delay
- 5.3. Pre-close delay
- 5.4 Opening speed
- 5.5. Closing speed

- 5.6. Ramp-up distance
- 5.7. Ramp-down distance
- 5.8. TRG stop distance
- 5.9. IRB stop distance
- 5.10. Crawl distance
- 5.11. Torque limit
- 5.12. PWM minimum

6. Infrared beams
- 6.1. PIRAC control
  - 6.1.1. PIRAC status
  - 6.1.2. Stop on open
    - 6.1.2.1. Stop on open status
- 6.2. IR beam test
  - 6.2.1. Status
  - 6.2.2. Test beam
- 6.3. IRBO=IRBC on closing
- 6.4. IR beam alarms
  - 6.4.1. Ambush alarm
    - 6.4.1.1. Ambush alarm status
  - 6.4.2. Break-in alarm status
    - 6.4.1.2. Broken IRB time
  - 6.4.3. Alarm output

7. Pedestrian
- 7.1. Pedestrian open position
- 7.2. Pedestrian Autoclose time
- 7.3. Pedestrian pre-open delay
- 7.4. Pedestrian pre-close delay

8. Courtesy light
- 8.1. Courtesy light timer
- 8.2. Light profile
  - 8.2.1. Courtesy light
  - 8.2.2. Pre-flash A
  - 8.2.3. Pre-flash B
  - 8.2.4. Pre-flash C

9. ChronoGuard
- 9.1. Time and date
- 9.2. Time periods
  - 9.2.1. Add time period
    - 9.2.1.1. Auto function
    - 9.2.1.2. Time-bar. function
  - 9.2.2. Delete time period
  - 9.2.3. Edit/review time periods

- 9.3. Exclusions
  - 9.3.1. Add exclusion
    - 9.3.1.1. Auto function
    - 9.3.1.2. Time-bar function
  - 9.3.2. Delete exclusion
  - 9.3.3. Edit/review
- 9.4. Delete all time periods and exclusions

10. General settings
- 10.1. Operating standard
- 10.2. Reset options
  - 10.2.1. Factory defaults
  - 10.2.2. Delete all remotes
  - 10.2.3. Delete all time periods and exlusions
  - 10.2.4. Reset all
- 10.3. Diagnostic screen status
- 10.4. Test button disabled status
- 10.5. Backup EEPROM
- 10.6. Restore EEPROM

11. Remote controls

Press button of valid transmitter *(if menu locked)*

11.1. Add remotes
11.2. Delete remotes ..... 11.2.1. Delete remote by ID
11.2.2. Delete remote button
11.2.3. Delete remote by button
11.2.4. Delete not present
11.2.5. Delete all remotes
11.3. Edit remote button
11.4. Autolearn
11.5. Lock Tx menu
11.6. Onboard receiver enable/disable

RSO5DC Controller features

Menu 2 - Safety (collision force)

- Collision force

  If the shutter is obstructed, the internal collision circuitry will activate. The response of the system to a collision will vary, depending on the profile (operating standard, e.g. ZA,) selected. Responses can vary from the shutter stopping, to the shutter reversing. The collision force can be set from minimum to maximum in five discrete steps

  A sixth step will disable collision sensing entirely, allowing maximum force to be achieved. Under this condition, the motor will continue running until it stalls, at which point a collision will be detected

This level should only be used if additional safety measures are taken. (E.g.: Infrared beams, sensitive edge etc.) Collision force can be set independently per direction of travel.

- Collision count
  - A counter monitors the number of collisions that the shutter experiences before it reaches the fully closed position. If the value exceeds the value set in the multiple collision counter the controller shuts down until the next valid trigger is received. As indication, the status LED will flash four times every two seconds. The multiple collision fault indication will continue to flash indefinitely or until a valid trigger has been received
- Alarm output

  After the preset collision count has been reached, an alarm is activated. The system can be configured to operate one of the following outputs provided on the controller:

- Pillar / Courtesy light contact (potential-free normally-open contact, fuse protected – 5A)
- Safety beam common (this is an open collector drive, max current draw 3A, not fuse protected)
- Status LED output (operate up to three LEDs in parallel or interface with multi-LED driver card, CP78)

- LCK as ESTOP

  Allows the LCK (Holiday Lockout) input to be configured as an emergency stop input

Menu 3 - Autoclose

- Autoclose status
  - The Autoclose feature when turned on, has the function of automatically closing the shutter after a preset Autoclose time. The Autoclose feature is automatically turned on when the controller is set for Condominium Mode of Operation.
- Autoclose time
  - The Autoclose time can be set anywhere from 1 to 255 seconds.
- Autoclose override
  - It is possible for the user to temporarily turn off Autoclose when the Mode of Operation is Standard or Reversing. To activate Autoclose override, the TRG input must be activated and maintained for a period longer than the time set for the Autoclose Override Time, after which the input can be cleared; ie press and hold the button of the remote that operates the roller-shutter
  - The shutter response will be to start opening on the first TRG trigger, and then to stop as soon as the Autoclose Override feature is activated. On clearing of the TRG input, the shutter will continue opening until fully open. The Autoclose feature is now off and the shutter will remain open indefinitely
  - The next signal received on TRG will clear the Autoclose Override feature, close the shutter, and set the Autoclose feature back to normal
- Autoclose advanced options
  - The conditions under which the shutter will Autoclose can be set within the Advanced Autoclose options menu:
  - Autoclose on open - automatically close the shutter if it has reached the fully open position
  - Autoclose on partly open - automatically close the shutter if it is stopped while opening, but before reaching the fully opened position
  - Autoclose on partly closed - automatically close the shutter if it is stopped while closing, but before reaching the fully closed position

More than one advanced option can be selected

Menu 4 - Modes of Operation

It is possible to select the following Modes of Operation: Standard, Condominium, Reversing, PLC and Deadman control Mode. All modes are triggered by closing a normally-open contact between the TRG input terminal and the COM terminal

- Standard mode

  When stationary, a trigger impulse on TRG will cause the shutter to either open or close. On a moving gate, a trigger impulse on TRG will stop the shutter. A third impulse on TRG will cause the shutter to reverse its direction of travel, i.e. the action is Start - Stop - Reverse

- Condominium mode

  A trigger impulse on TRG will under all conditions open the shutter. If it were closing, it will stop and reverse to open. In this Mode of Operation, the only way to close the shutter is with the Autoclose feature which is automatically activated when Condominium mode is selected

- Reversing mode

  A trigger impulse on TRG will reverse the direction of a moving shutter. If it were closing, it will stop and immediately begin opening. If it were opening, it will stop and immediately begin closing.

- PLC Mode
  - A trigger impulse on FRX (N/O) will cause the shutter to open. A trigger impulse on the TRG (N/O) will cause the shutter to close
  - A trigger impulse on the LCK / STP (N/C) will cause the shutter to stop

- Deadman Control Mode (DMC)
  - A permanent trigger on FRX (N/O) will cause the shutter to open. Removing the trigger will cause the shutter to stop
  - A permanent trigger on TRG (N/O) will cause the shutter to close Removing the trigger will cause the shutter to stop
  - A permanent trigger on LCK / STP (N/C) will stop a moving shutter, and

Roller

Menu 5 - Run profile

- Positive Close Mode (PCM) (not recommended for roller-shutters)

  Setting Positive Close Mode to ON will allow the curtain to drive up hard to an endstop without causing the collision circuitry to operate. This feature operates only during the last few millimeters of shutter travel in closing mode

- PCM push force

  The amount of force applied by the motor when in PCM can be set as a percentage of full motor force

- Pre-open delay

  Allows a delay between a valid trigger signal being received and the shutter commencing movement in the opening direction. A warning light can be set to activate during this delay. (Refer to Pre-flash modes of the feature PILLAR LIGHT, for more details)

- Pre-close delay

  Allows a delay between a valid trigger signal being received and the shutter commencing movement in the closing direction. The delay will also occur if the shutter is set to close automatically. A warning light can be set to activate during this delay. (Refer to Pre-flash modes of the feature PILLAR LIGHT, for more details)

- Opening speed
  Sets the opening speed as a percentage of the maximum shutter speed. This can be set from 22-100%. Selecting max will move the shutter at maximum possible speed

- Closing speed
  Sets the closing speed as a percentage of the maximum shutter speed. This can be set from 22-100%. Selecting max will move the shutter at maximum possible speed

- Ramp-up distance
  Sets the ramp-up distance as a percentage of travel of the shutter when an endpoint is reached. This can be set from 2% to 30% in 1% steps

- Ramp-down distance
  Sets the ramp-down distance as a percentage of travel of the shutter when stopping. This can be set from 2% to 30% in 1% steps.

- TRG stop distance
  Sets the distance over which a moving shutter will stop after a TRG input is received, as a percentage of total shutter travel. This can be set from 1% to 10% in steps of 1%

- IRB Stop Distance
  Sets the distance over which a moving gate will stop after an Infrared Safety Beam is broken, as a percentage of total shutter travel. This can be set from 1% to 10% in steps of 1%

- Crawl Distance
  Sets the final crawl distance as a percentage of travel of the shutter when reaching an endpoint. This can be set from 5% to 30% in steps of 1%

- Torque Limit
  Sets the maximum torque delivered by the motor. The maximum setting is a value of 10 and the minimum is 4. This is useful in cases where limited push force is required

- PWM Minimum
  Sets the minimum speed at which the shutter will be allowed to crawl, both during the limit setup procedure and during normal operation before reaching an endpoint. The maximum setting is a value of 90% of maximum speed and the minimum is 5%. It is highly recommended that the PWM Minimum be set to maximum during limit setup, as configuring it to a lower value will result in the procedure taking unnecessarily long

Menu 6 - IR beams

- PIRAC

  Passive-Infrared Autoclose causes the shutter to automatically close as soon as a vehicle has passed through the closing beams. This security feature ensures that the shutter stays open for the minimum amount of time possible

  If the AUTOCLOSE feature has been enabled when the shutter is triggered to open, but nothing moves through / breaks the closing beam, the shutter will open fully and stay open for the period of time determined by the AUTOCLOSE timer. However, if at any stage, while the shutter is opening or standing open waiting to close, the beams are broken, the shutter will close immediately

- IR Beam Test

  Automatically tests the safety beams before each shutter cycle. (eg as required by CE and UL325).

  In order for this feature to work, the power supply negative of the beam transmitter must be wired to the SAF COM terminal of the controller

- IRBO=IRBC

  Configures the opening beam to act as a closing beam while the shutter is closing

- IR beam alarms
  While the gate is fully closed, this feature allows the following alarms:

  - Ambush alarm
    Activates an alarm if either the opening or closing beams have been continuously interrupted for a predefined time. The alarm will remain activated while the beams are interrupted.

    For example, if a would-be intruder covers the beams so that when the gate is opened, the gate will stay open, the system will detect this beam override taking place and set off an alarm.
  - IR beam broken time
    The time that the beams must be interrupted before the alarm is activated.

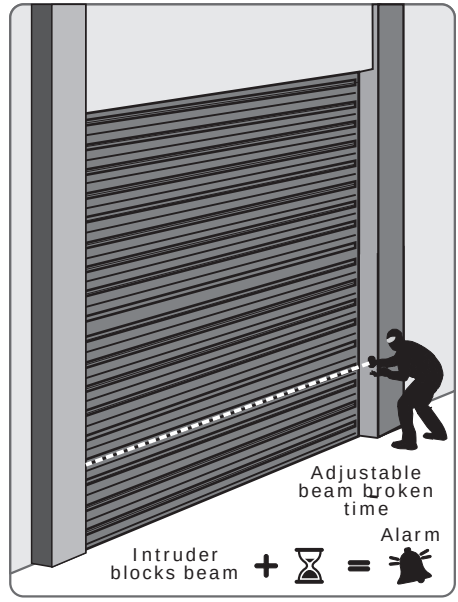


FIGURE 33

  - Break-in alarm
    Activates an alarm if the closing beam on the outside of the property is interrupted. The alarm remains activated while the beams are broken, and for a period of 30 seconds thereafter. This time is fixed.

If this alarm is used, it is recommended that TWO parallel closing beams are used to reduce the chance of false triggering.

FIGURE 34

- Alarm output
  The system can be configured to operate one of the following outputs provided on the controller:
  - Onboard buzzer – emits a continuous tone.
  - Pillar / Courtesy light contact (potential-free normally-open contact, fuse protected – 3A).
  - Safety beam common (this is an open collector drive, max current draw 3A, not fuse protected).
  - Status LED output (operate up to three LEDs in parallel or interface with multi LED driver card, CP78).

Menu 7 - Pedestrian opening

This feature is associated with the PED input on the controller. When activating this input, the system will open the shutter to the pedestrian open position, and then automatically close after the pedestrian Autoclose time lapses. The shutter will open only after the adjustable pre-opening delay time.

If the connection to COM is maintained then the shutter will remain open, and when the connection is broken, it will close after the PEDESTRIAN Autoclose time.

- Pedestrian open position
  Sets the maximum distance that the shutter will open for pedestrians as a percentage of the total shutter travel..
- Pedestrian Autoclose time
  Sets the Autoclose time in seconds after a pedestrian opening.
- Pedestrian pre-open delay
  Sets the time delay between the pedestrian input being activated, and the shutter actually opening. While this feature can be used with roller-shutters, it is mostly a safety feature associated with sliding and swing gate motors where pedestrians have to reach through the gate in order to activate the pedestrian input. A warning light would typically be active during this delay. This delay can be set from zero seconds to four minutes in one second steps.
- Pedestrian pre-close delay
  Sets the time delay between the pedestrian Autoclose timer expiring, and the shutter actually closing. A warning light would typically be active during this delay.

The warning light is any light wired to the courtesy (pillar) light contacts, as described in Menu 8, which follows.

Menu 8 - Courtesy (pillar) light

This feature is associated with the LIGHT connections on the controller.

The pillar light circuit has multiple functions:

- It operates as a courtesy light and switches on for a timed period every time the shutter is activated.
- It can also be turned on for the same timed period by momentarily connecting the AUX input to COM.(eg activating a pushbutton connected to these terminals)
- Via the same pushbutton connected across AUX and COM, it can also be turned ON permanently by application of an impulse longer than 3 seconds. The fact that the pillar light is ON permanently is indicated by the STATUS LED flashing once every second. A short impulse thereafter will switch the lights off.

The roller-shutter will not open when using the Aux trigger input.

- When the PED input is triggered the courtesy light flashes for an adjustable (1 to 255 seconds) pre-flash time before opening to the pedestrian opening.
- Courtesy light time
  The time that the courtesy light will remain activated can be set from 4 seconds to 10 minutes.
- Light profile
  - The courtesy light can be selected to operate according to one of the following:
  - Courtesy light
    If pre-flashing Mode A, B or C is selected, the courtesy light circuit will activate for the selected pre-opening and pre-closing delay. The manner of activation is dependent on the pre-flashing mode selected.
    - Mode A will turn on the courtesy light only while the motor is running
    - Mode B will flash the courtesy light during the pre-opening delay, as well as while the shutter is running
    - Mode C will turn on the courtesy light during the pre-opening delay, as well as while the shutter is running. In these pre-flashing modes, the timed courtesy light functionality is not available.

Menu 9 - ChronoGuard (Time periods)

- ChronoGuard (a world first)is a powerful feature which has been added to the new generation CENTURION controllers. An integral Real Time Clock (RTC) is used to provide time-based functionality, including the automatic activation or time-barring of specific controller inputs, and the time-barring of specified remote control buttons used together with the onboard CENTURION code-hopping receiver.
- The RTC will keep time for a minimum of one hour without any power
- Time-periods

- Time Periods
  A Time-period is defined by a start and end date and time. Up to 100 Time-periods can be defined. A Time-period can be a once off event, or can be set to repeat on a weekly or annual basis. The weekly repeat can be chosen to occur on every day of the week, weekdays only, weekends only, or any specific day. The minimum duration of a Time-period is one minute. Once off Time-periods have the highest precedence, followed by annual and then weekly. When appropriate, a “Tp” icon will appear on the display to indicate that a Time-period is active.
- Auto-activations (Auto function)
  The following controller inputs can be set to activate automatically during a Time-period:
  - Free-exit (FRX)
  - Pedestrian opening (Ped)
  - Holiday Lockout (Lck)
  - Closing beam (IRBC)
  - Courtesy light control (Aux)

  During the relevant Time-period, the selected input will be activated. Where appropriate, the diagnostic LED of the relevant input will illuminate.
- Time-barring
  Time-barring of inputs is divided into physical inputs and RF inputs (inputs mapped to a CENTURION code-hopping transmitter button)

  The following physical inputs can be Time-barred (prevented from operating) during a Time-period:
  - Trigger (Trg)
  - Pedestrian opening (Ped)
  - Free-exit (FRX)
  - Holiday Lock (Lck)
  - Courtesy light control (Aux)

  The following physical outputs can be Time-barred (prevented from operating) during a Time-period:
  - Courtesy (pillar) light relay (Light)

  The following RF inputs can be Time-barred (prevented from operating) during a Time-period:

  - Trigger (Trg)
  - Pedestrian opening (Ped)
  - Free-exit (FRX)
  - Holiday Lock (Lck)
  - Courtesy light control (Aux)

Time-barring of a CENTURION code-hopping transmitter is specified at the time of coding the transmitter into the system. Once an RF input is defined as time-barred, any Time-barred transmitter associated with that input will be time-barred during the relevant Time-period. If a physical or RF input is currently Time-barred, any attempt to activate it will be acknowledged by a short beep of the onboard buzzer. The input, however, will not activate.

- Exclusions
  Exclusions are used to prevent scheduled Time-periods from occurring at specific times (eg: public holidays). While Time-barring can be used to achieve a similar end, exclusions can also be used to exclude Time-barring itself. Each exclusion consumes one Time-period. Exclusions have the highest precedence, followed by Time-barring and then auto-activations (auto function).

Menu 10 - General features

- Operating Standard
  Regional operating standards can be set. Applying this setting will automatically configure the controller settings to conform to the specific region's standard - e.g. UL325 or CE.
- Reset options
  The controller settings can be reset through the reset options menu. Various reset options are available:
  - Factory Defaults – Depending on the operating standard / profile chosen all these settings will be restored. No other settings such as remote controls, limit switch settings will be affected.
  - Delete All Remotes - Delete all the remotes stored in the system, no settings affected.
  - Reset All – Clears the system completely as per an off the production line unit.
- Diagnostic screen
  Allow a diagnostic screen to be displayed. Can be useful when troubleshooting, but requires some technical knowledge.
- Round test button
  Allows the round test button on the controller to be disabled, in cases where higher security is required.

Menu 11 - Remote controls

The controller is capable of learning up to 500 CENTURION code-hopping remote controls / transmitters. Each transmitter can have up to four buttons. Each transmitter learned into the system is assigned a unique transmitter ID.

- It is possible to artificially increase the number of buttons of a multi-button transmitter by using a two button combination
- One of the buttons is used as a shift button to allow the other buttons to be used again in combination with this button. In other words the user will press and hold the shift button, before pressing one of the other buttons to create a new button
- The shift button cannot be used as a button on its own, it must always be used in combination with the other buttons

Benefits of the shift button system:

- Use of the shift button system allows a three button transmitter to gain an extra button and operate four functions and likewise a four button transmitter gains two extra buttons and can operate six functions
- Another benefit of using the shift button system is that it requires both hands to operate the two button combination. This prevents the user from accidentally enabling sensitive functions such as Holiday Lockout on the controller

Each transmitter learned into the system is assigned a unique transmitter ID.

- Press valid button
  If the remote controls menu has been locked as discussed later, only by pressing a button of a transmitter learned into the system, can the remote controls menu be accessed.
- Add remote
  Any button can be set to control the trigger, pedestrian, free-exit, Holiday Lockout or courtesy light inputs. When adding transmitters it is recommended that a record be kept of the ID number allocated by the system to each respective transmitter and the person to whom the transmitter is given. This is necessary should selective deletion be required at a later stage.
- Delete remote
  Transmitters can be edited at any stage according to one of the following:
  Delete Remote ID - Each transmitter can be deleted individually according to its unique ID. To facilitate this, a record of the ID and the person to whom the ID has been assigned must have been made at the time of learning the transmitter into the system.
  - Delete Remote Button -
    The operation of a button on a particular transmitter can be cleared i.e. it allows for instance Holiday Lockout set on one remote to be cleared without affecting the other operations that the transmitter performs.

- Delete remote by button
  Use this procedure to remove the transmitter from the system. All button functionality will be removed. The transmitter is required for this operation.
- Delete-Not-Present
  Allows for transmitters that have not been used within a selectable time period to be removed from the system. The Time-period can be set from one hour to seven days, in one hour increments.
- Delete all remotes
  Clears the entire memory. All transmitters will be removed.

- Edit remote button
  Change the function of one button to another.
- Autolearn
  Allows a Time-period to be set, during which any specific button will be learned to a specific function when it is pressed. The function will also be activated when the button is pressed. After the Time-period has expired Autolearn is disabled, and no further buttons will be learned.
- Tx menu locked
  Allows the “Remote Controls” menu to be locked, preventing the unauthorized addition of new transmitters to the system. Once enabled, the “Remote Controls” menu can only be accessed by pressing a valid transmitter button
- Onboard receiver
  The onboard CENTURION code-hopping receiver can be disabled in the unlikely event that it causes interference with an existing external receiver

Fuse protection

Item	Type	Rating
Main controller		
Motor circuit	Automotive fuse ATO (25 x 7mm)	30A
Light circuit	5 x 20mm	3A fast blow
Auxiliary supply	Electronic limit	300mA
Charger		
Mains input	5 x 20mm	3A fast blow✻

✻ Not user serviceable

RSO5DC Diagnostic LEDs

The RSO5DC controller has a series of diagnostic LEDs which indicate the state of the inputs. Normally-open inputs are indicated by a RED LED, and normally-closed inputs by a GREEN LED. An illuminated RED LED indicates that the signal is present (e.g.: intercom button pressed), while an illuminated GREEN LED indicates that the signal is absent (e.g.: IRB not broken).

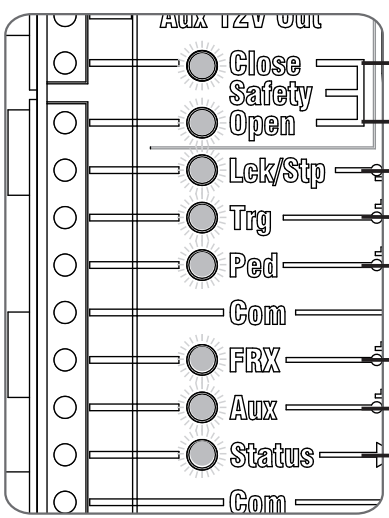


FIGURE 35

Safety close - green
On when the closing beam is not activated

Safety open - green
On when the opening beam is not activated

Lck/Stp - green
On when the Lck/Stp input is not activated

Trg - red
On when the trigger signal is present

Ped - red
On when the pedestrian signal is present

FRX - red
On when a free-exit signal is present

Aux - red
On when an auxiliary signal is present

Status- red
This LED indicates the state of the shutter as per the table below:

RSO5DC Roller-shutter status LED

Off	Shutter is closed
On	Shutter is partially / fully open
Continuous slow flash	Shutter is opening
Continuous fast flash	Shutter is closing
1 flash every 2 seconds	Pillar light override is activated
2 flashes every 2 seconds	No mains is present
3 flashes every 3 seconds	Battery voltage is low
4 flashes every 2 seconds	Multiple collisions have occurred

RSO5DC LCD display

The LCD display shows useful information regarding the status of the system.

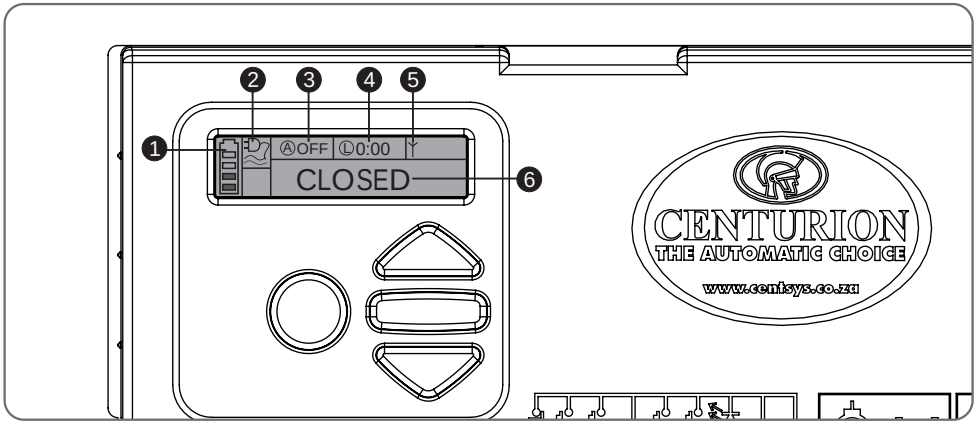


FIGURE 36

1. Battery icon
   Indicates the state of charge of the battery.
   - Four solid bars = full capacity
   - Two solid bars = 50% capacity
   - No solid bars, with the icon flashing = battery empty
2. Mains icon
   Displays the presence/absence of mains voltage:
   - Plug solid = mains present and battery charging
   - Plug hollow and flashing = No mains present and battery not charging
3. Autoclose information
   - Displays the state of the Autoclose function
   - Displays off if Autoclose is not selected
   - OVR if Autoclose is overridden, and the remaining Autoclose time if Autoclose is active
   - POVR indicates that the PIRAC option is overriden
4. Pillar light information
   - Displays the remaining light time if Courtesy Light Mode is selected
   - Pre-flashing mode is displayed if pre-flash is selected
   - LIT will be indicated if the pillar light has been turned on permanently
5. Onboard receiver information
   Displays the current input being activated by the onboard receiver.
6. Status information
   Displays useful information regarding the status of the shutter.

RSO5DC Buzzer feedback

A warning buzzer will sound (where applicable) as per the table below:

Inhibitor name	Priority	Number of beeps	Fault type	Gate continues to operate	User can correct error
Break-in alarm	1	Continuous tone for 30 seconds	Alarm	N/A	N/A
Ambush alarm	2	Continuous tone until IRBs are cleared	Alarm	N/A	N/A
Battery low	4	3 beeps periodically for 30 seconds	Power system fault	Yes❇	Yes
Multiple collision	3	Periodic until condition is cleared by user (500/500ms)	Collision	No	Yes
Auxiliary overload	5	5 beeps periodically for 30 seconds	Hardware	No	No
Holiday Lockout	6	1 beep periodically for 30 seconds	User	No	Yes
Emergency stop	7	1 beep periodically for 30 seconds	User	No	Yes
Time-barring	8	1 beep periodically for 5 seconds	User	No	Yes
No limits set	9	3 short beeps for 5 seconds	Lost	No	Yes
Mains failure	10	2 beeps periodically for 30 seconds	Power system fault	Yes	Yes
Beams broken (any)	11	1 beep periodically for 30 seconds	User	No	Yes
Beams failure	12	5 beeps periodically for 30 seconds	Hardware	No	No
Fuse blown	14	5 beeps periodically for 30 seconds	Hardware	No	Yes
Motor disconnected	15	5 beeps periodically for 30 seconds	Hardware	No	Yes
Bridge damaged	16	5 beeps periodically for 30 seconds	Hardware	No	No
Shutter stalled	17	4 beeps periodically for 10 seconds	Collision	No	Yes

❇ Shutter will close fully and then shut down for two minutes

RSO5DC factory defaults schedule

South African standard profile - ZA

Parameter Description	Unit	Minimum	Default	Maximum
Menu 1 - not applicable				
Menu 2				
Opening collision force	Level	1	3	Max
Closing collision force	Level	1	3	Max
Collision count	Collisions	1	4	255
Alarm output	B, CL, SC, LED		B	
LCK as ESTOP	Yes or No		No	
Menu 3				
Autoclose status	On/Off		Off	
Autoclose timer	mm:ss	00m:00s	00m:15s	04m:00s
Autoclose override time	mm:ss	00m:00s	00m:03s	04m:00s
Autoclose from fully open	On/Off		On	
Autoclose from partly open	On/Off		On	
Autoclose from partly closed	On/Off		Off	
Menu 4				
Modes of Operation	S, C, R, P, D		S	
Menu 5				
PCM status*	On/Off		Off	
PCM force	%	10%	30%	100%
Pre-open delay time	mm:ss	00m:00s	00m:00s	01m:05s
Pre-close delay time	mm:ss	00m:00s	00m:00s	01m:05s
Opening speed	%	22%	Max	Max
Closing speed	%	100%	Max	Max
Ramp-up distance	% Travel	2%	5%	30%
Ramp-down distance	% Travel	2%	5%	11%
TRG stop distance	% Travel	1%	3%	10%
IRB stop distance	% Travel	1%	3%	10%
Crawl distance	% Travel	5%	10%	30%
Torque limit	A	4A	15A	15A
Menu 6				
PIRAC control	On/Off		Off	
Stop on open	On/Off		Off	
Stopping distance	%	0%	2%	5%
IR beam test	On/Off		Off	
Test beam	IRBC/IRBO/both		IRBC	
IRBO=IRBC	On/Off		Off	

* Not advisable for roller-shutters

Parameter Description	Unit	Minimum	Default	Maximum
Menu 6 (continued)				
Ambush alarm	On/Off		Off	
Ambush time	hh:mm	00h:01m	00h:01m	04h:00m
Break-in alarm	On/Off		Off	
Alarm output	B, CL, SC, LED		B	
Menu 7				
PED opening	%	0.05m	1m	see note*
PED Autoclose	mm:ss	00m:00s	00m:05s	04m:25s
PED pre-open delay	mm:ss	00m:00s	00m:02s	04m:00s
PED pre-close delay	mm:ss	00m:00s	00m:00s	04m:00s
Menu 8				
Light timer	h:mm:ss	0h:00m:04s	0h:02m:00s	9h:59m:59s
Light profile	CL, PFA, PFB, PFC		CL	
Menu 9 - not applicable				
Menu 10				
Operating Standard	Z,C,U		ZA	
Factory defaults	Yes/No		No	
Delete all remotes	Yes/No		No	
Reset All	Yes/No		No	
Menu 11				
Delete-Not-Present	On/Off		Off	
Autolearn	On/Off		Off	
Tx Menu lock	On/Off		Off	
Onboard receiver	On/Off		On	
*Limited by gate length				

Legend

B	Onboard buzzer	PFA	Pre-flashing mode A
C	Condominium mode	PFB	Pre-flashing mode B
CL	Courtesy light	PFC	Pre-flashing mode C
D	Deadman Control Mode	R	Reversing Mode
IRBC	Closing safety beams	S	Standard Mode
IRBO	Opening safety beams	SC	Safety common
LED	Status LED	Tx	Transmitter
P	PLC mode		

Power connections

- RSO5 and RSO5R variants must be connected to a 220V AC and RSO9 and RSO5R3P to a 380V AC mains supply via the power supply cables provided with the kit. The cables are connected to the respective power supply units during the assembly process; however, should any of the connections come loose, the diagrams below illustrate the terminals to which they should be connected in each case

Ensure that all electrical power to the operator is disconnected before attempting to conduct any work on the power supply of the operator. All work should be carried out by a suitably qualified technician

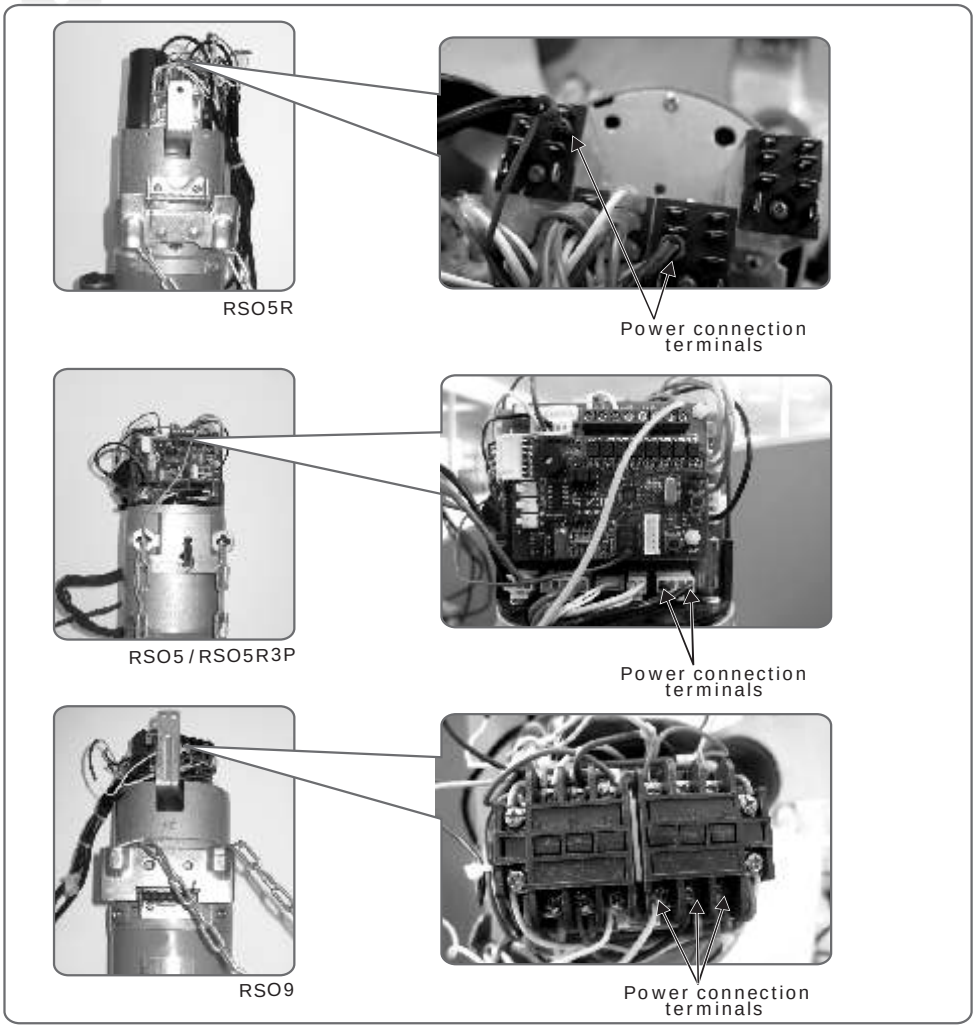


FIGURE 37. POWER CONNECTIONS

13. Setting the Travel Limits

The limit switch assembly

- In order for the door to stop in the desired open and closed positions, the strikers must be adjusted to activate the corresponding limit switches for each position.

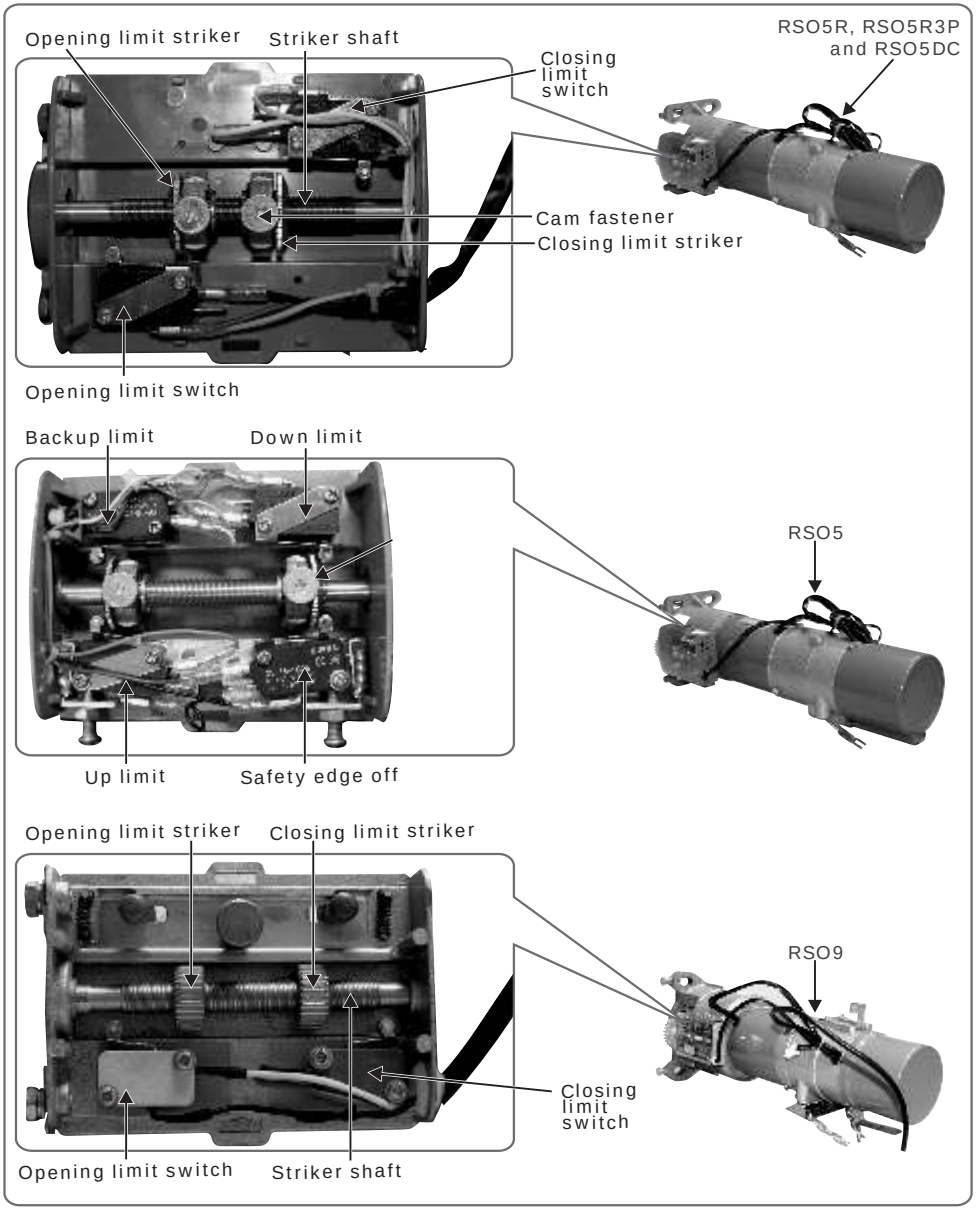


FIGURE 38

RSO5, RSO5R and RSO5R3P

The RSO5 provides a total of four limit micro-switches. In addition to the open and closed switches, provision has also been made for a Safety Edge Off switch as well as a Backup Limit (for the open position) switch. The Safety Edge Off switch will be triggered first when the shutter is travelling towards its closing limit, and serves to disable the sensitive edge fitted to the leading edge of the shutter (if installed). This is done to ensure that the collision circuitry does not activate and cause the shutter to re-open once it has reached the fully closed position.

The Backup Limit switch serves as a failsafe should the open limit switch malfunction, and will stop the shutter in the open position.

To set the limits:

- Make use of a small flat screwdriver to open the limit switch housing
- Use a Phillips screwdriver to loosen the two cam fasteners. .
- Using the hand chain, manually hoist the shutter until it is in the desired open position.
- Turn the opening striker by hand along the shaft until it is activating the corresponding micro-switch for the open position.
- Now use the hand chain to hoist the shutter until it is in the desired closed position.
- Turn the appropriate striker until it is activating the micro-switch for the closed position.
- Use the wall pendant to test the operation in both the opening and closing directions as well as to stop the motor. Ensure that the fasteners are tightened and that the strikers travel the desired distances for opening and closing before activating the limit switches. Upon triggering the motor, an audible beep will indicate that one of the limit switches is currently being activated.

It is advisable that the open limit is set slightly short from the fully open position to allow space for the safety limit to be activated.

RSO5DC

Section 12 provides the full menu of features that can be set up on the system. An explanation of each feature is provided in Section 12, Controller features

When setting up the D10/D10 Turbo system via the LCD display, all the steps that have to be followed are clearly provided via the display. It is only necessary to note the following:

- **To get into setup mode, press the enter (▬) button for two seconds and follow the instructions provided from there**
- **The buttons provided on the controller for navigating the system are not marked because at each step during the setup, the function given to each button is provided on the display**

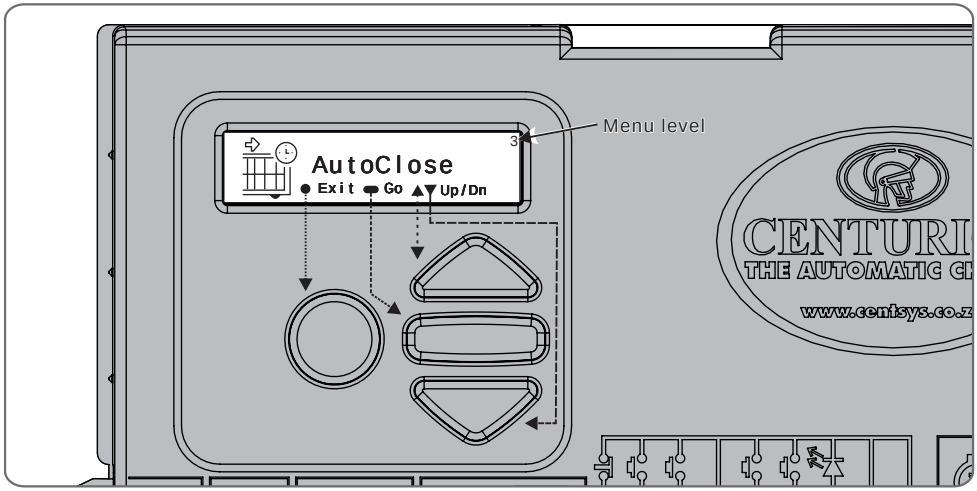


FIGURE 39

- When not in setup mode, i.e. normal mode, the (●) button is used as a test button for operating the system
- The triangular up or down (▲▼) buttons are used to scroll through the diagnostic screens
  - For each feature a factory default setting has been programmed into the controller. Referred to as an operating standard or profile, these defaults have been determined to suit the requirements of the specific region where the installation is being carried out. It is only necessary to change a feature where the default does not suit the installation. When selecting any feature in the menu, details of the current setting stored in the controller are displayed
  - Refer to Section 12 for the Schedule of factory defaults for each feature

If at any stage you wish to abort the limit setup procedure, simply disconnect one of the battery leads.

To set the limits:

- Make use of a small flat screwdriver to open the limit switch housing
- Use a Phillips screwdriver to loosen the two cam fasteners.
- Turn both strikers by hand until they are more or less in the centre of the striker shaft.
- Using the hand chain, move the door to the desired open or closed position.
- Turning the corresponding striker by hand, move it until the micro-switch is activated. (click can be heard)
- Using the hand chain, move the door to the opposite position.
- Again using the hand chain move the door off the micro-switch so that neither of the micro-switches are being activated. Enter Setup Mode by pressing and holding the centre ellipse button for a period of two seconds.

Ensure that the cams are not activating either the open or the closed micro-switch before attempting to set the limits! If it is, first move the cams away from the switches by using the hand chain.

- Using the hand chain move the door off the micro-switch so that neither of the micro-switches are being activated. Enter Setup Mode by pressing and holding the centre ellipse button for a period of two seconds.
- Using the directional arrows, scroll to Menu 5: Run Profile and enter the menu by momentarily pressing the centre button.
- Now scroll to PWM Minimum and confirm the selection by momentarily pressing the centre button.
- Use the directional arrows to configure the PWM Minimum to a value of 90. Again, confirm the selection by pressing the centre button.
- Press the round button twice until it shows 'Run Profile' and scroll to Menu 1: Setting Limits. Enter the menu by pressing the centre button.
- You will now be guided through the limit setup procedure by an intuitive Setup Wizard. Carefully read each prompt on the display and confirm using the centre button.

Certain prompts are related to CENTURION sliding gate operators and might not be applicable

- The operator will complete four cycles in total; two to establish the position of the opening and closing limits, and two to confirm the positions.
- Once the procedure is complete, the Wizard will prompt you as to whether the shutter is open. If it is, simply confirm using the centre button. If, however, the shutter is in the closed position, toggle the display to NO and confirm with the centre button.
- The RSO5DC is now ready for use.
- Some fine adjustment of the strikers might be required. This can be done after completing the limit setup.

RSO9

While the procedure for setting the end-of-travel limits on the RSO9 is more or less the same as with other RSO variants, there are subtle differences when it comes to securing the limit strikers.

To set the limits:

- Make us of a flat screwdriver to open the limit switch housing.
- Ensure that the strikers can be rotated freely by hand; if they cannot, pull the securing studs towards you and away from the operator, and slide them to the opposite end of the vertical slot.
- Using the hand chain, manually hoist the shutter until it is in the desired open position.

- Turn the opening striker by hand along the shaft until it is activating the corresponding micro-switch for the open position.
- Now use the hand chain to hoist the shutter until it is in the desired closed position.
- Turn the appropriate striker until it is activating the micro-switch for the closed position.
- Once you are satisfied that the curtain travels the correct distance in both the opening and closing directions, secure the strikers again by pulling the securing studs towards you and then to the opposite end of the vertical slot, ensuring that the strikers cannot be moved by hand.
- Use the wall pendant to test the operation in both the opening and closing directions as well as to stop the motor. Ensure that the fasteners are tightened and that the strikers travel the desired distances for opening and closing before activating the respective limit switches.

14. Connecting an external radio receiver

Connecting an external radio receiver*

It is possible to connect an external receiver to the controller by making use of one of the four inputs provided. Incorporating a radio receiver will enable users to operate the door remotely.

Each input has the following operation associated with it:

	For Standard Mode of Operation, connect the receiver's normally-open output to this terminal. Pressing the remote button once (from the fully closed position) will cause the door to start opening. Pressing the button a second time will cause the door to stop immediately, and a third button press will cause the door to move in the opposite direction, i.e. start closing
	Connecting the receiver's normally-open output to this terminal will allow for a Close Only Mode of Operation. In other words, each button press will move the door in the closing direction only
	Connecting the receiver's normally-open output to this input will cause the door to stop immediately
	Connecting the receiver's normally-open output to this terminal will allow for an Open Only or Free-exit Mode of Operation. Pressing the remote button will only initiate an opening cycle

- In addition to these four inputs, +12V as well as ground are provided on the controller. Refer to Figure 40 for a visual representation of the connections
- Using a multi-channel receiver provides the user with the ability to activate the open, close and stop functions using three different buttons on the transmitter.

* External receivers can only be connected to the RSO5 and RSO5DC models.

15. Connecting infrared beams

Infrared safety beams can be fitted and is recommended for enhanced safety. The RSO5 controller* offers a normally-open input which will, upon closing of the contact (i.e. the beams being broken), cause the door to stop immediately or to reverse direction, depending on whether the REV pins have been bridged on the controller. The installation of IR beams is considered critical as it helps prevent crushing

Infrared safety beams are connected to the controller as follows:

*Infrared beams can only be connected to the RSO5 and RSO5DC models

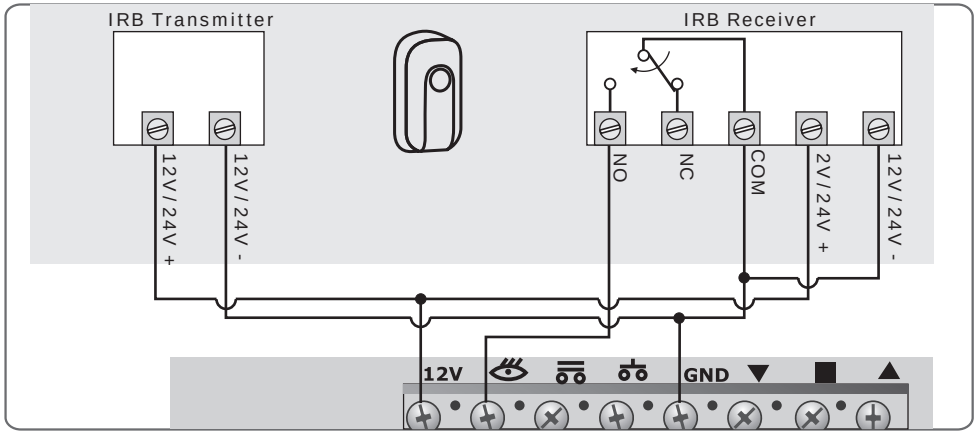


FIGURE 40. INFRARED BEAMS WIRING DIAGRAM FOR RSO5

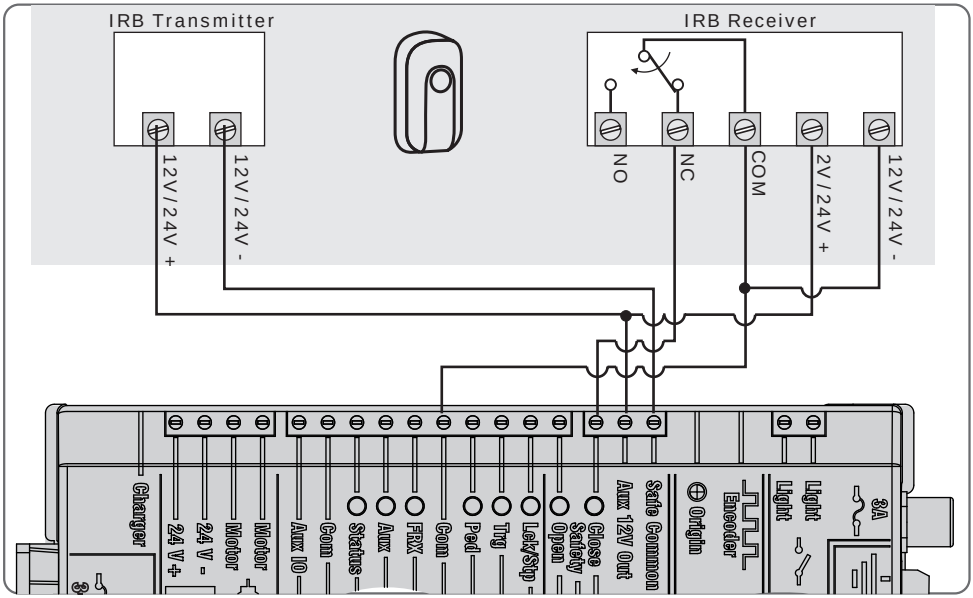


FIGURE 41. CLOSING INFRARED BEAMS WIRING DIAGRAM FOR RSO5DC

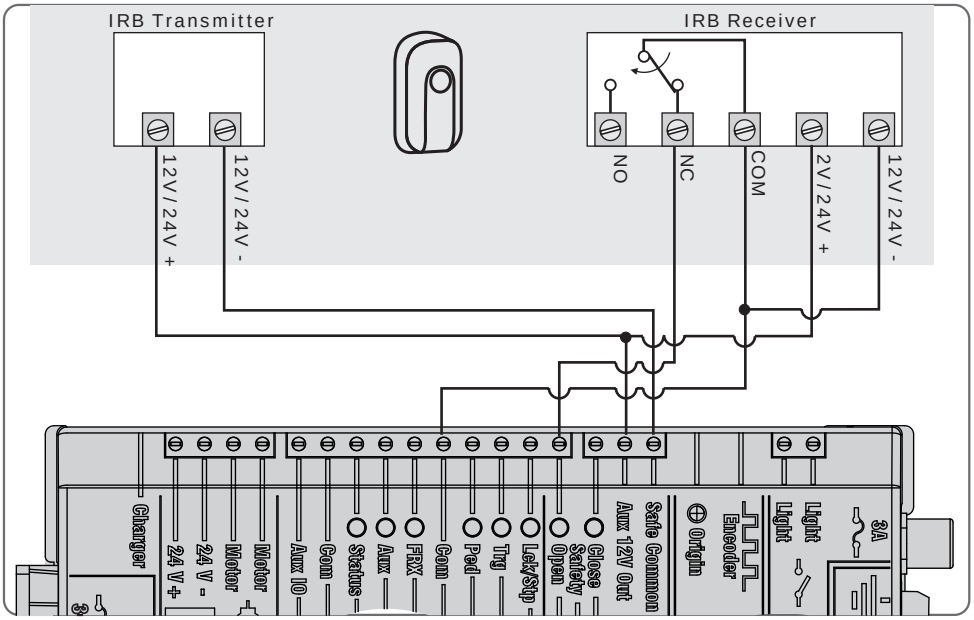


FIGURE 42. OPENING INFRARED BEAMS WIRING DIAGRAM FOR RSO5DC

16. RSO5DC Wiring diagram for other inputs

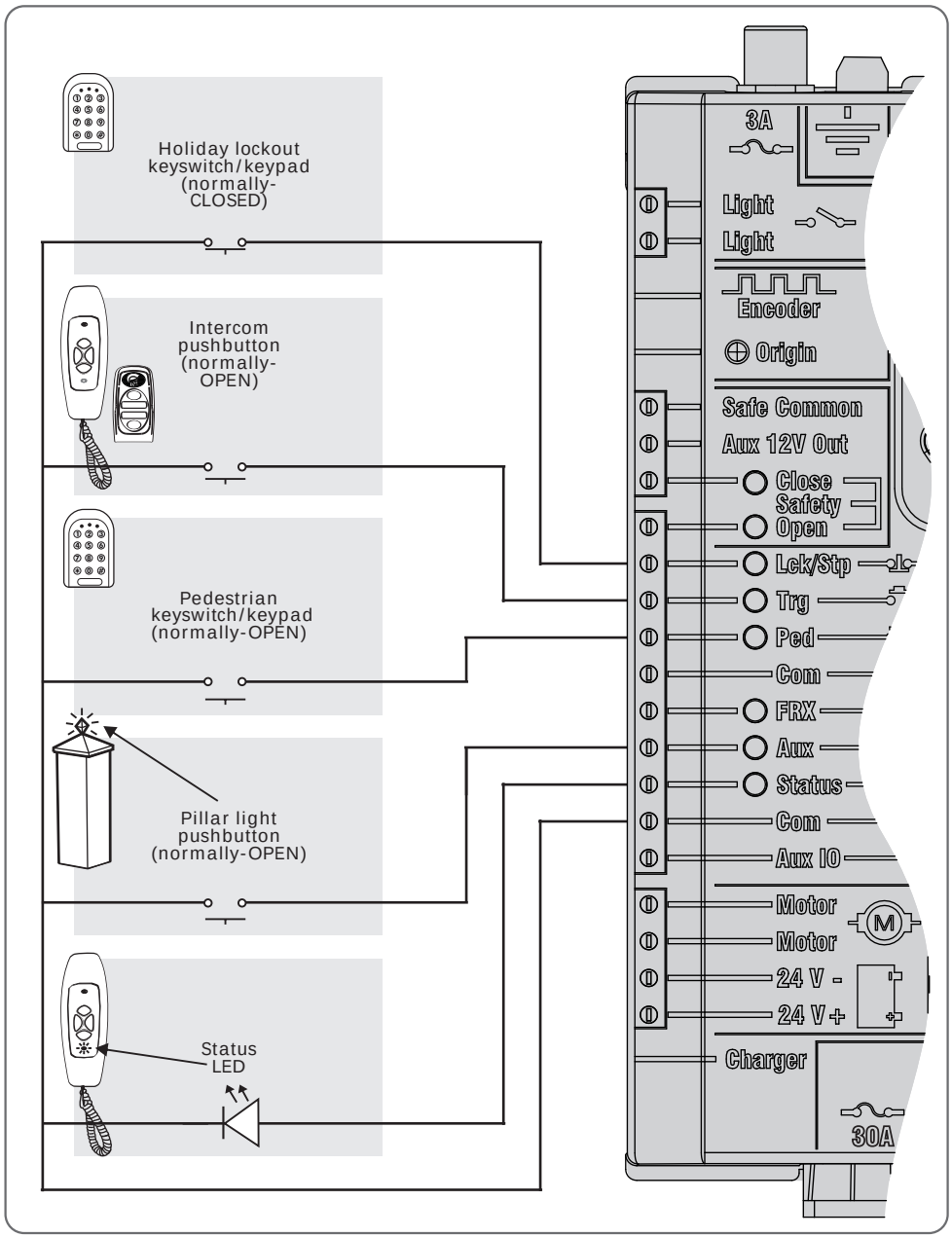


FIGURE 43

17. Manual operation

The CENTURION Industrial RSO offers two different modes of Manual Operation, namely complete disengagement of the gearbox – by overriding the mechanical braking mechanism - and chain-driven manual operation. A five metre chain has been provided with the system to allow for manual operation even from a floor-level.

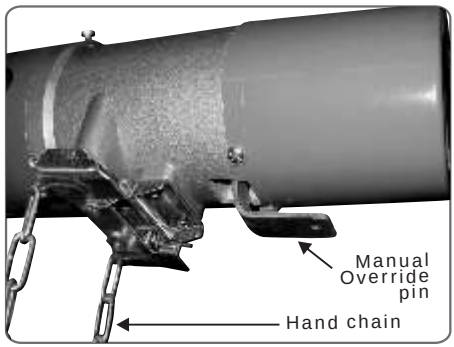


FIGURE 44. RSO5R and RSO5R3P MANUAL OVERRIDE

- To completely disengage the gearbox, simply pull the manual override pin towards you, as indicated in Figures 44, 45 and 46. This will cause the operator's gearbox to be overridden and the door can then be operated by hand

If the door is completely or partially open, ensure that there are no people, pets or other obstructions directly underneath the door as disengaging the gearbox will release the door and possibly cause it to close at great speed, and could potentially cause serious injury or even death

For chain-driven manual operation, the gearbox must be engaged and the chain hoisted in the desired direction of travel

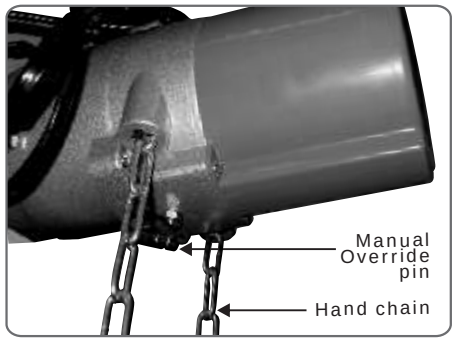


FIGURE 45. RSO5 and RSO5DC MANUAL OVERRIDE

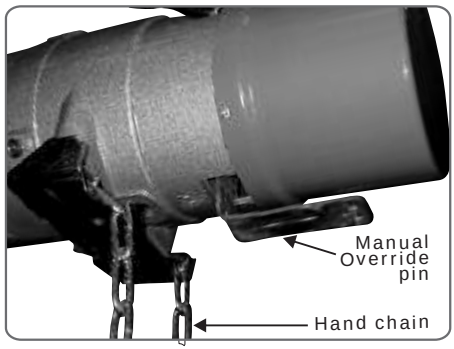


FIGURE 46. RSO9 MANUAL OVERRIDE

18. Installation handover

Once the installation has been successfully completed and tested, it is important for the installer to explain the operation and safety requirements of the system.

NEVER ASSUME THE USER KNOWS HOW TO SAFELY OPERATE THE RSO!

Even if the user has used one before, it does not mean he knows how to SAFELY operate it. Make sure that the user fully understands the following safety requirements before finally handing over the site. Ensure that the end user has all the safety and user instructions included with the product

The following needs to be understood by the user:

- How to operate the manual release mechanism. (Show them how by demonstration)
- All the features and benefits of the operator, i.e. safety beams, etc.
- All the safety considerations associated with operating an RSO. The user should be able to pass this knowledge on to all other users of the automated system and must be made aware of this responsibility

- Do not activate the RSO operator unless you can see it and can determine that its area of travel is clear of people, pets, or other obstructions
- NO ONE MAY CROSS THE PATH OF A MOVING ROLLER-SHUTTER. Always keep people and objects away from the entrance
- NEVER LET CHILDREN OPERATE OR PLAY WITH THE RSO operator CONTROLS, and do not allow children or pets near the entrance
- Be careful with moving parts and avoid close proximity to areas where fingers or hands could be pinched
- Secure all easily accessed RSO operator controls in order to prevent unauthorized use of the roller-shutter
- Keep the automated RSO system properly maintained, and ensure that all working areas are free of debris and other objects that could affect the RSO operation and safety
- On a monthly basis, check the safety devices for correct operation
- All repair and service work to this product must be done by a suitably qualified person

This product was designed and built strictly for the use indicated in this documentation. Any other use, not expressly indicated here, could compromise the good condition/operation of the product and/or be a source of danger!

CENTURION SYSTEMS (Pty) Ltd does not accept any liability caused by improper use, of the product, or for use other than that for which the automated system was designed.

Notes

Notes

Notes

CENTURION

Sharecall 0860-CENTURION (0860 236 887)

Sharecall Technical Support 0861 003 123
from 07h00 to 18h00 (GMT+2)

(Sharecall numbers applicable when dialed from within South Africa only)

0.07.A.0005

www.centsys.com